2.0 ALTERNATIVES INCLUDING THE PROPOSED ACTION

2.1 NEPA Guidance for Alternatives

The Council on Environmental Quality regulations for implementing the procedural provisions of NEPA require that the agency preparing the analysis consider all reasonable alternatives in addition to the proposed management action. The agency must also evaluate the environmental consequences of activities (such as fish harvest) that would take place under each alternative selected for analysis. Chapter 3 (Affected Environment), Chapter 4 (Environmental Consequences), and Appendix C, the Regulatory Impact Review/Initial Regulatory Flexibility Analysis (RIR/IRFA) present the issues and evaluate the impacts for the range of alternatives analyzed in this EIS, thus providing the basis for selection among these alternatives by the agency and the public. Alternatives that were considered but not selected for further analysis are reviewed in Section 2.5.

2.2 Background and Alternative Formulation

This section provides the background information needed to understand the development and formulation of alternatives examined in this analysis.

2.2.1 History of Habitat Policy

Efforts to integrate habitat considerations into the fishery management process go back to passage of the Magnuson-Stevens Act in 1976. The Magnuson-Stevens Act established eight regional fishery management councils and charged them to recommend management plans throughout the ranges of commercial and recreational fish species occurring in the U.S. EEZ. Some believed this directive gave the Councils authority to consider fishery-related habitat issues nearshore and further inland, even though the states have responsibility for managing fisheries within the territorial sea under most conditions.[1] Although some efforts were made to address significant fishery habitat issues, the Councils and NMFS concentrated largely on ocean harvest during the first decade under the Magnuson-Stevens Act.

In 1983, NMFS adopted a national Habitat Conservation Policy, uniting its Magnuson-Stevens Act authority with its advisory responsibilities and authority under the Fish and Wildlife Coordination Act (FWCA) and NEPA. The policy provided guidance to the agency regarding its interactions with the Councils and other federal and state agencies. It also directed NMFS to focus its habitat conservation efforts on specific habitat problems affecting fishery resources, marine mammals, and endangered marine species. Although the new NMFS policy alerted other agencies and the Councils to NMFS' intent, it did not clarify the Councils' role regarding fishery-related habitat issues. The NMFS habitat policy was incorporated into the Alaska Region FMPs through BSAI Groundfish FMP Amendment 9 and GOA Groundfish FMP Amendment 14.

In 1986, Congress amended the Magnuson-Stevens Act, essentially codifying elements of the NMFS Habitat Conservation Policy and giving the regional councils new authority and responsibility to include readily available habitat information in all fishery management plans. The amendments directed the Councils, with guidance from NMFS, to evaluate the effects that changes in habitat could have on managed fisheries. Additionally, the 1986 amendments gave the Councils the opportunity to recommend habitat management measures for ongoing and proposed federal or state activities that could adversely affect fishery resources under a regional council's management authority. Federal agencies were

[1]For exceptions, see the Magnuson-Stevens Act, Public Law 94-265, Section 306 (b).

required to respond specifically and substantively to the regional councils' recommendations. In September 1988, the North Pacific Council adopted the following policy statement, along with guidelines for carrying it out:

> The Council shall assume an aggressive role in the protection and enhancement of habitats important to marine and anadromous fishery resources. It shall actively enter Federal decision-making processes where proposed actions may otherwise compromise the productivity of fishery resources of concern to the Council. Recognizing that all species are dependent on the quantity and quality of their essential habitats, it is the policy of the North Pacific Fishery Management Council to: conserve, restore, and maintain habitats upon which commercial, recreational and subsistence marine fisheries depend, to increase their extent and to improve their productive capacity for the benefit of present and future generations. (For purposes of this policy, habitat is defined to include all those things physical, chemical, and biological that are necessary to the productivity of the species being managed.) This policy shall be supported by three policy objectives, which are to:
>
> (1) Maintain the current quantity and productive capacity of habitats supporting important commercial, recreational, and subsistence fisheries, including their food base. (This objective will be implemented using a guiding principle of no net habitat loss caused by human activities.)
> (2) Restore and rehabilitate the productive capacity of habitats which have already been degraded by human activities.
> (3) Maintain productive natural habitats where increased fishery productivity will benefit society.

The Magnuson-Stevens Act was amended in 1996 by the Sustainable Fisheries Act. The Magnuson-Stevens Act, as revised, mandated that any FMP must describe and identify EFH for the fishery, minimize to the extent practicable adverse effects on such habitat caused by fishing, and identify other actions to encourage the conservation and enhancement of such habitat. EFH has been broadly defined by the Magnuson-Stevens Act to include "those waters and substrate necessary to fish for spawning, breeding, feeding, or growth to maturity." On December 19, 1997, NMFS published EFH guidelines as an interim final rule (62 FR 66531). All eight regional Councils were required to amend their fishery management plans by October 1998 as follows:

- Identify and describe EFH for species managed under a fishery management plan.
- Describe adverse impacts to that habitat from fishing activities and non-fishing activities.
- Recommend conservation and enhancement measures necessary to help minimize impacts, protect, and restore the habitat.
- Include conservation and enhancement measures necessary to minimize to the extent practicable, adverse impacts from fishing on EFH.

NMFS revised the EFH regulations via a final rule on January 17, 2002 (67 FR 2343).

2.2.2 Overview of Previous Actions to Protect Fish Habitat

In light of the habitat policies discussed in the previous section, the Council and NMFS enacted certain measures that were designed, at least in part, to protect habitat from potential negative impacts from the groundfish fisheries. These measures include gear restrictions, time and area closures, and harvest restrictions. Of these, the most widely used is closure of areas to certain gear types, in effect creating a

type of marine protected area. Additional measures that were adopted primarily for other purposes, such as effort limitation and fishery rationalization, also have been beneficial to fish habitat. A review of these measures is provided in this section.

2.2.2.1 Fishing Equipment Restrictions

The regulations for managing adverse effects on EFH from fishing (50 CFR 600.805-815) indicate that fishery management actions may include, but are not limited to, seasonal and areal restrictions on the use of specified equipment, equipment modifications to allow escapement of particular species or particular life stages (e.g., juveniles), prohibitions on the use of explosives and chemicals, prohibitions on anchoring or setting equipment in sensitive areas, and prohibitions on fishing activities that cause significant damage to EFH.

The Council and NMFS have implemented several restrictions to fishing equipment, primarily to reduce bycatch. These measures have had a secondary benefit of reducing the effects of fishing on EFH. A review of fishing equipment measures implemented for scallop, crab, and groundfish fisheries is provided in this section. There are numerous area and species-specific gear regulations for salmon as well (see www.cf.adfg.state.ak.us for details), but these are not specified here because gear used in the salmon fishery does not generally contact the seafloor.

Scallop Dredge Restrictions—In the Alaska weathervane scallop fishery, dredge size is limited to a maximum width of 15 feet, and only two dredges may be used at any one time. In the Kamishak District of Cook Inlet, only one dredge with a 6-foot maximum width is allowed. Dredges must have rings with a 4-inch minimum inside diameter to reduce the catch of small, immature scallops.

Pot Gear Restrictions—In the BSAI king and Tanner crab pot fisheries, pot size is limited to a maximum of 10 feet by 10 feet. Pots used in the crab and groundfish fisheries are required to have biodegradable panels. Additionally, pots used in groundfish fisheries must have rigid tunnel openings that are no larger than 9 inches by 9 inches to reduce bycatch of halibut. Pots used in Tanner crab fisheries must have smaller openings to exclude king crab. Escape rings or a large mesh panel are also required in crab pots.

Trawl Gear Restrictions—In 1999, BSAI Groundfish FMP Amendment 57 implemented a regulation to require that vessels fishing for BSAI pollock use only pelagic trawl gear (i.e., bottom trawls[2] are prohibited). Part of the rationale for this regulation was that it would reduce the adverse effects of trawling on habitat and would simultaneously reduce bycatch. A recent study on the effects of trawling and dredging on seafloor habitat, prepared by the National Research Council (NRC), noted the following: "Disturbance depends on the extent of contact of the gear with the seafloor; gear designs that minimize bottom contact can reduce habitat disturbance" (NRC 2002).

Allowable Gear Definitions—In 1999, NMFS published a list of fisheries and fishing gear used in those fisheries under the authority of the Councils and the Secretary (64 FR 4030). The use of any gear or participation in a fishery not on the approved list is prohibited. For North Pacific fisheries, the regulation established the allowable gear for the BSAI crab fishery (pots), Alaska scallop fishery (dredges and diving gear), Alaska salmon FMP fisheries (hook and line), and BSAI and GOA groundfish fisheries

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[2]The terms "bottom trawl" and "nonpelagic trawl" are used synonymously throughout this EIS. These terms are defined in regulations at 50 CFR § 679.2 as "trawls that do not meet the definition of pelagic trawls." Although this could be confusing (as pelagic trawls are sometimes fished on the bottom, but are, nonetheless, not included here in the definition of bottom trawls), the term "bottom trawls" is used because it appears more frequently in common speech than "nonpelagic trawls." It is, therefore, less likely to confuse readers not immersed in the regulatory language.

(trawl, hook and line, handline, longline, pot/trap). These regulations prohibit the use of unlisted gear types such as gill nets, explosives, chemicals, and other gears that could have adverse effects on EFH.

2.2.2.2 Marine Protected Areas and Marine Managed Areas

Marine protected areas (MPAs) can be used to preserve or restore fish habitats. Establishing areas closed to particular gear types is a common tool used in fishery management to protect benthic habitats from adverse effects. The regulations for managing adverse effects on EFH from fishing (50 CFR 600.805 - 815) note that fishery management actions may include, but are not limited to, closing areas to all fishing or specific equipment types during spawning, migration, foraging, and nursery activities and designating zones for use as marine protected areas to limit adverse effects of fishing practices on certain vulnerable or rare areas/species/life stages, such as those areas identified as HAPCs. Further, as noted by the NRC, "closed areas effectively protect biogenic habitats (e.g., corals, bryozoans, hydroids, sponges, seagrass beds) that are damaged by even minimal fishing" (NRC 2002).

The Council, NMFS, and the Alaska Board of Fisheries (ABOF) have adopted numerous area closures for fishing to protect habitat for fish, crabs, and marine mammals. A review of these closures is provided below and summarized in Table 2-1. A map showing the areas closed to bottom trawling year-round is shown in Figure 2-1.

Pribilof Islands Habitat Conservation Area—BSAI Groundfish FMP Amendment 21a established the Pribilof Islands Habitat Conservation Area in the EBS. Beginning in 1995, this 7,000-square-nautical-mile (nm^2) area was closed to all trawling and dredging year-round to protect blue king crab habitat (primarily shell hash). In an effort to coordinate habitat benefits, the ABOF also adopted a closure.

Bristol Bay Trawl Closure Area—About 8,000 nm^2 of Bristol Bay was closed to all trawling beginning in 1987 with the implementation of BSAI Groundfish FMP Amendment 10, to protect crab habitat. This replaced the Bristol Bay Pot Sanctuary, which had been in place from 1975 through 1984, and was designed to keep foreign trawl fisheries from interfering with the domestic crab pot fishery. To further protect juvenile red king crab and critical rearing habitat (stalked ascidians and other living substrate), BSAI Groundfish FMP Amendment 37 established a 19,000-nm^2 year-round closure to all trawling in all of Bristol Bay, beginning in 1997 (Ackley and Witherell 1999). Specifically, the area east of 162° W (i.e., all of Bristol Bay) is closed to trawling and dredging, with the exception of a small area bounded by 159° to 160° W and 58° to 58°43' N that remains open to trawling from April 1 to June 15 each year. As it did for the Pribilof Islands Conservation Area, the ABOF adopted a closure in state waters adjacent to the Bristol Bay Trawl Closure Area to coordinate habitat benefits.

Red King Crab Savings Area—In 1995, the Red King Crab Savings Area was established by emergency rule as a year-round bottom trawl and dredge closure area. This 4,000-nm^2 area is known to have high densities of adult red king crab from the Bristol Bay stock. The closure became permanent in 1997 with implementation of BSAI Groundfish FMP Amendment 37.

Kodiak Trawl Closure Areas—In the Kodiak Island area, trawl closure areas were designed based on the use of areas by crab at different life stages. Three types of areas were designated. Type I areas, totaling 1,000 nm^2, have very high king crab concentrations and, to promote rebuilding of the crab stocks, are closed all year to all trawling except with pelagic gear. Type II areas have lower crab concentrations and are only closed to non-pelagic gear from February 15 through June 15. Type III areas are adjacent to Type I and II areas and have been identified as important juvenile king crab rearing or migratory areas. Type III areas are closed to trawling following a determination that a "recruitment event" has occurred.

These closures were first established in 1987 by GOA Groundfish FMP Amendment 15, extended by Amendment 18, and were permanently established by Amendment 27.

Southeast Alaska Trawl Prohibition—In 1991, longline fishermen from Sitka and other local citizens proposed that all trawling be prohibited off Southeast Alaska. The rationale for this was that trawling was causing long-term damage to deep sea corals, causing conservation problems for rockfish, and causing social disruption to the local fishing industry (Behnken 1993). Although the original proposal was not adopted when brought to the Council for final decision, it was later adopted as part of the license limitation program that was implemented under GOA Groundfish FMP Amendment 41. Beginning in 1998, all trawling was prohibited in Southeast Alaska, a 52,600 nm^2 area.

Cook Inlet Trawl Closure Area—In 2002, Cook Inlet was closed to bottom trawling under GOA Groundfish Amendment 60, to reduce the effects of fishing on crab stocks and crab habitat. This area totals about 7,000 nm^2.

Sitka Pinnacles Marine Reserve—Sitka residents' concern about the risk of overfishing the concentrations of lingcod at the Sitka Pinnacles near Mount Edgecumbe led to the establishment of the Sitka Pinnacles Marine Reserve, which was implemented in 2000 as GOA Groundfish FMP Amendment 59. All bottom fishing gear types (except pelagic troll gear used for salmon) were prohibited in this small 3-nm^2 area. The pinnacles provide habitat that is productive for a variety of species, including several types of rockfish and lingcod.

Steller Sea Lion and Walrus Islands Closure Areas—To protect walrus, fishing vessels are prohibited in the EBS within 12 miles of Round Island, the Twins, and Cape Peirce in northern Bristol Bay, from April 1 through September 30. These area closures, which total 900 nm^2, were first established in 1989 under BSAI Groundfish FMP Amendment 13. To protect the western stock of Steller sea lions, many regulations have been implemented to reduce the effects of fishing since the ESA listing in 1990. These measures include 3-nm no-entry zones (all vessels) around rookeries, 10-nm and 20-nm no-trawl zones around rookeries, and, more recently, additional seasonal and year-round closures to fishing for pollock, mackerel, and cod within much of the Steller sea lion critical habitat area. The measures recently approved relative to Steller sea lion protection provide full or partial closure to 58,000 nm^2 of the ocean.

Seasonal Groundfish Closure Areas—Numerous seasonal closures have been established to protect habitat and reduce bycatch of crabs, salmon, and herring in the EBS (Witherell and Pautzke 1997). In 1987, BSAI Amendment 10 established a Bristol Bay trawl closure and bycatch limits for Tanner crab and red king crab. If these limits are reached, additional closures may occur. Amendment 12a established bycatch limits for halibut, which, if attained, result in closures to target groundfish fisheries in the entire management area. In 1991, BSAI Amendment 16a established Herring Savings Areas, which close 30,000 nm^2 to trawling on a seasonal basis when a herring bycatch limit for trawl fisheries is reached. The Chum Salmon Savings Area, established in 1995 by BSAI Groundfish FMP Amendment 35, is closed to all trawling in 5,000 nm^2 from August 1 through August 31 and remains closed if a bycatch limit of 42,000 chum salmon is taken. In 1996, BSAI Groundfish FMP Amendment 21b established the Chinook Salmon Savings Areas, in which trawling is prohibited in 9,000 nm^2 upon attainment of a bycatch limit. The Chinook salmon limits were later reduced by Amendment 58 in 2000 (Witherell et al. 2002).

Scallop Dredge Closure Areas—The ABOF has established seasonal and year-round closures in state waters, as well as the EEZ, to fishing with scallop dredges, as allowed under the Alaska Scallop FMP. Extensive areas of the EEZ have been closed in the vicinity of Kodiak, the Alaska Peninsula, Unimak

Island, Unalaska Island, and Amchitka Island. These closures were established to address a variety of concerns, including reduced crab bycatch and habitat protection.

State Waters Trawl and Dredge Closure Areas—Nearly all areas of the GOA within state waters have been closed to bottom trawling and dredging to protect sensitive nearshore habitats. State waters of Bristol Bay and the Pribilof Islands have also been closed to trawling and dredging.

2.2.2.3 Harvest Limits

The regulations for managing adverse effects on EFH from fishing (50 CFR 600.805-815) note that fishery management actions may include, but are not restricted to, limits on the take of species that provide structural habitat for other species assemblages or communities and limits on the take of prey species.

Tightly Controlled Catch Limits for Target Species—Total removals of groundfish (as well as crabs and scallops) are controlled by conservative catch quotas. Harvest levels are based on annual stock assessments, which are reviewed by the Council's groundfish plan teams and Scientific and Statistical Committee. Total allowable catch (TAC) levels are essentially annual harvest quotas for the fishery. These TACs are set at or below acceptable harvest levels from a stock perspective. The harvest level specifications account for all groundfish harvested, including fish landed and those discarded (100 percent mortality for all discards is assumed). Fisheries are closely monitored through reporting requirements and a comprehensive observer program, and directed fisheries for each species or complex are closed before the TAC is taken. Using this process, management has been effective at maintaining catches of groundfish within biologically acceptable levels. Because all fish species are prey to other FMP species at some or all of their life cycle stages (including the adult stage for some), conservative harvest limits for target species of groundfish also serve to limit the take of prey.

Optimum Yield Limits—The combined total of all TACs for all groundfish species is limited to a maximum of 800,000 metric tons (mt) for the GOA and 2.0 million mt for the BSAI. The optimum yield (OY) limit was adopted as a precautionary measure beginning in 1982 to account for uncertainties in stock estimation and fishery management techniques. The OY limit in the BSAI has greatly limited catches and effort because the total acceptable biological catch levels have greatly exceeded the OY limits. Thus, a large portion of the potential catch is left unharvested. Consequently, there is much less fishing effort (and thus lower impacts on EFH from fishing) than might have occurred in the absence of OY limits.

Forage Fish Prohibition—In 1998, Groundfish FMP Amendments (BSAI 36, GOA 39) were implemented. These amendments prohibit any directed fishery on forage fish from developing. Forage fish include capelin, smelt, and a host of other species, which are important prey for groundfish, seabirds, and marine mammals. Note that the EFH regulations state that loss of prey (either by reducing the availability of these species or impacting their habitat) may be considered an adverse effect on EFH. The forage fish prohibition addresses the effects of fishing on these prey species by not allowing them to be harvested.

2.2.2.4 Effort Reduction and Limitation

The effects of fishing on fish habitat depend to some extent on the amount and intensity of fishing effort. Simply put, lowering fishing effort of bottom tending gear reduces the impacts to benthic habitat. The NRC noted the following: "Effort reduction is the cornerstone of managing the ecological effects of fishing, including, but not limited to, effects on habitat" (NRC 2002).

The Council and NMFS have adopted effort limitation measures for the groundfish, crab, and scallop fisheries to control fishing effort and keep the overcapitalization situation from worsening during development of a long-term rationalization program for the fisheries. Although habitat protection was not a rationale used for developing these programs, limiting effort does benefit habitat. A review of these programs is provided in this section.

Groundfish and Crab Vessel Moratorium—FMP Amendments (BSAI Groundfish 23, GOA Groundfish 28, BSAI Crab 5) limited harvesting capacity by issuance of moratorium permits for qualifying vessels. The moratorium became effective in 1995.

Scallop Vessel Moratorium—A vessel moratorium was adopted as Scallop FMP Amendment 2 and implemented in 1997. The 3-year vessel moratorium was designed to restrict new entry into the scallop fishery while a more comprehensive plan was being developed. Eighteen vessels qualified for moratorium permits.

Groundfish and Crab License Limitation—The License Limitation Program (LLP) (BSAI Groundfish FMP Amendment 60, GOA Groundfish FMP Amendment 58, BSAI Crab FMP Amendment 10) replaced the vessel moratorium beginning with the 2000 fishing season. The LLP reduced the number of vessels eligible to participate in the overcapitalized crab fisheries and provided further capacity restrictions in the groundfish fisheries.

Scallop License Limitation—Scallop FMP Amendment 4 implemented a restrictive license limitation program beginning in 2001. Only nine licenses to fish for Alaska scallops were issued under this program. The entire fishery is, thus, limited to nine vessels towing a maximum of two dredges each.

2.2.2.5 Fishery Rationalization Programs

Rationalization of excess fishing capacity can result in reduced impacts to fish habitat. "Rationalization" is a term used to describe fishery management measures that result in an allocation of labor and capital between fishing and other industries to maximize the net value of production. Rationalization can reduce excess fishing capital, allow fisheries to occur in a more orderly and efficient manner, and create incentives for fishing to occur in the areas where catch rates are highest and gear loss is lowest. Fisheries operating under a rationalized program will probably experience a reduction in fishing effort (which can be measured by, for example, the amount of time gear is on the bottom) and, thus, reduced impacts to habitat. A recent study of the effects of trawling on bottom habitat by the NRC noted the following: "The establishment of some form of rights-based fishery management program (e.g., individual fishing quotas) is one approach for meaningful and permanent reduction of fishing effort" (NRC 2002). The Council and NMFS have implemented rationalization programs for some fisheries already, and other programs are under development (e.g., BSAI crab fishery, GOA groundfish fisheries). A review of existing programs is provided in this section.

Halibut and Sablefish Individual Fishing Quota—In 1995, the Halibut and Sablefish Individual Fishing Quota (IFQ) program for the halibut and sablefish longline fishery was implemented by FMP Amendment (BSAI 15, GOA 20). The IFQ program transformed the short-season, derby-style fishery into an orderly 8-month fishery, resulting in improved economic efficiency, reduced conflicts and gear loss, reduced deadloss and bycatch mortality, improved safety, and other improvements to the fishery (Pautzke and Oliver 1997).

Groundfish and Crab Community Development Quota—The western Alaska Community Development Quota (CDQ) program began in 1992 as part of two major management initiatives. As part of the halibut

and sablefish IFQ program, percentages of the BSAI quotas were set aside for this program. In that same year, as part of the inshore/offshore pollock allocations (Groundfish FMP Amendments 18/23), the Council also set aside 7.5 percent (since increased to 10 percent) of the pollock quota for exclusive use by 65 remote coastal communities with limited economic infrastructure along the EBS. The program was expanded to include 7.5 percent of all groundfish and crab in 1995. The NRC has reviewed the program development (1999b).

American Fisheries Act—The American Fisheries Act (AFA) was passed by Congress in 1998 and implemented by the Council in the following year. Under the AFA, access to the EBS pollock fisheries was limited to a specific number of qualifying vessels and processors, and a system of fishery cooperatives was put in place. These actions allow the fleet to effectively assign individual vessel catch and bycatch accountability. The results of this rationalized fishery include a 50 percent reduction in the number of large catcher/processors operating in the fisheries, more effective monitoring of pollock quotas, numerous time and area closures to protect sea lions, reduced bycatch of non-target species, and significantly higher utilization rates (pound of product per pound of raw fish caught).

Members of the EFH Committee prepared a discussion paper that describes these rationalization programs in more detail and explains how the programs reduce the effects of fishing on EFH (Gauvin et al. 2002). The paper examined the results of rationalization programs already implemented (the halibut/sablefish IFQ fishery and the EBS pollock fishery), as well as the potential effects on other fisheries being considered for rationalization programs (the BSAI crab fisheries and the Bering Sea rock sole fishery). The paper concluded that rationalization of fisheries will result in added habitat conservation. The halibut/sablefish IFQ program has reduced the amount of gear set and has also allowed fishermen to target prime grounds to avoid rocky, high-relief areas associated with coral and sponge communities. The pollock harvesting cooperatives have ended the race for fish and reduced the number of vessels in the fleet, thereby reducing the overall impact of the fishery on EFH. For the rock sole fishery, eliminating the race for fish and redundant fishing effort would be expected to reduce the number of fishing hours and trawl area swept by 30 to 50 percent. The proposed BSAI crab fisheries rationalization program is also expected to result in reduced effects on habitat by lowering total effort (number of pot lifts), decreasing gear loss, and increasing selectivity.

2.2.2.6 Other Fishery Regulations that Protect Fish Habitat

Roe Stripping Prohibition—In 1991, Groundfish FMP Amendments (BSAI 14, GOA 19) prohibited the practice of roe stripping (keeping just the valuable roe, while discarding the fish carcasses). Part of the rationale for this regulation was that rotting fish carcasses on the bottom could adversely affect fish habitat, so implementation would be beneficial to habitat.

EFH Descriptions and HAPC Designations—In 1998, FMP Amendments (BSAI Groundfish 55, GOA Groundfish 55, BSAI Crab 8, Scallops 5, and Salmon 5) identified and described EFH and identified HAPC types, fishing and non-fishing activities that may adversely affect EFH, prey species and their habitat, and research and information needs, as well as describing options for the conservation and enhancement of EFH (see the following section for more detail).

2.2.2.7 Original EFH FMP Amendments 55/55/8/5/5

In 1996, the Sustainable Fisheries Act mandated that any FMP must describe and identify EFH for managed fisheries, minimize to the extent practicable adverse effects on such habitat caused by fishing, and identify other actions to encourage the conservation and enhancement of such habitat. To meet the requirements of the EFH provisions of the Sustainable Fisheries Act, as well as the EFH guidelines

(50 CFR 600.805 - 815), the Council prepared one EA/RIR/IRFA for all five FMPs under its jurisdiction. In June 1998, the Council adopted the following five amendments intended to comply with the new EFH requirements:

- Amendment 55 to the FMP for the Groundfish Fishery of the BSAI
- Amendment 55 to the FMP for Groundfish of the GOA
- Amendment 8 to the FMP for BSAI King and Tanner crabs
- Amendment 5 to the FMP for Scallop Fishery off Alaska
- Amendment 5 to the FMP for the Salmon Fisheries in the EEZ off Alaska

An environmental assessment analysis (Final Draft for Secretarial Review dated January 1999 [Council 1999a]) and a background habitat assessment report were prepared for this amendment package. Three alternatives were considered, including the status quo. The alternative adopted and approved defined EFH as all habitat within a general distribution for a species life stage, for all information levels, and under all stock conditions. A general distribution area is a subset of a species range. For any species listed under the Endangered Species Act (ESA), EFH includes all areas identified as critical habitat. EFH was described in text, tables, and maps. The alternative EFH description that was not chosen would have described EFH more narrowly as areas of high concentration for each life stage. The alternative chosen was more conservative in that defining a larger area may offer more protection. Habitat areas of particular concern were identified not as specific areas, but instead by types that met the criteria specified in the interim final rule (62 FR 66531, December 19, 1997; see the following section). These included living substrates in shallow and deep waters and freshwater habitats used by anadromous fish. No mitigation measures were adopted as part of the EFH amendment package. Notice of Secretarial Approval of Amendments 55/55/8/5/5 was published on April 26, 1999 (64 FR 20216). The effective date of implementation was January 20, 1999.

2.2.2.8 Additional HAPC Amendments Considered by the Council

HAPCs are areas of special importance that may require additional protection from adverse effects. Regulations at 50 CFR 600.815(a)(8) state the following:

> FMPs should identify specific types or areas of habitat within EFH as habitat areas of particular concern based on one or more of the following considerations:
>
> (i) The importance of the ecological function provided by the habitat.
> (ii) The extent to which the habitat is sensitive to human-induced environmental degradation.
> (iii) Whether, and to what extent the development activities are, or will be, stressing the habitat type.
> (iv) The rarity of the habitat type.

In June 1998, the Council identified three habitat types as HAPC within EFH Amendments 55/55/8/5/5. Habitat types, rather than specific areas, were identified as HAPCs because little was known at the time regarding where these habitat types were located. These HAPC types include the following:

- Areas with living substrates in shallow waters (e.g., eelgrass, kelp, mussel beds, etc.)
- Areas with living substrates in deep waters (e.g., sponges, coral, anemones, etc.)
- Freshwater areas used by anadromous fish (e.g., migration, spawning, and rearing areas)

In June 1998, the Council solicited proposals to amend the FMPs to identify HAPCs and establish conservation measures to minimize, to the extent practicable, adverse impacts from fishing on HAPCs.

In October 1998, the Council approved several proposals regarding HAPCs for analysis. These proposals requested that a gap analysis be prepared and additional habitat types and areas be identified as HAPCs. Proposed HAPC habitat types included seamounts and pinnacles, the ice edge, the shelf break, and biologically consolidated fine-grained sediments. Proposed specific HAPC areas included a deep basin in Prince William Sound, the Chirikov Basin north of St. Lawrence Island, and the red king crab bycatch areas around Kodiak Island.

At the February 2000 meeting, the Council reviewed an initial draft of a proposed amendment that would consider identifying additional HAPCs and two management measures to protect HAPCs from fishing effects. The first management measure considered would potentially prohibit directed fishing (and indirect bycatch fishing) for certain HAPC biota (corals, sponges, kelp, rockweed, and mussels). The second measure would establish several marine protected areas where gorgonian corals are found in abundance based on trawl survey data. Gorgonian corals have been shown to be very long lived, easily damaged by fishing gear, and slow to recover from damage. Rockfish have been observed to aggregate in the same areas as corals (Heifetz 2002). Based on public testimony and input from its advisory committees, the Council dropped the proposed closure areas for gorgonian coral protection and voted to split the remaining portions of the amendment and associated analysis into the following two parts: Part 1 would allow for control over the harvest of HAPC biota; Part 2 would develop a more comprehensive and iterative process for HAPC identification and habitat protection involving researchers, stakeholders, and management agencies.

At the April 2000 meeting, the Council took final action on harvest control measures of HAPC Part 1. The Council voted to add corals and sponges to the prohibited species category. This action would have essentially split prohibited species into two types: the first type would continue to allow no retention for halibut, salmon, herring, and crab species, and the second type would include only corals and sponges as prohibited species whose management would be specified in the regulations. The HAPC-prohibited species regulations would allow retention, but would prohibit the sale, barter, trade, or processing of corals and sponges. Kelp (including rockweed) and mussels would not be subject to any management actions. This action would have applied to both the EBS and GOA groundfish fisheries in the EEZ; other fisheries may be considered for HAPC biota protection in the future. The Council also relayed its concerns to the ABOF regarding protection of HAPC biota in state waters.

In February 2001, NMFS informed the Council that it would not be pursuing Amendment 65 regulations because the approach could not fully achieve the stated goal of preventing a fishery from developing for corals and sponges. NMFS instead suggested that the most efficient option would be for the Council to ask the state to prohibit commercial fishing for these HAPC species in the EEZ outside of state waters. Section 306(a)(3) of the Magnuson-Stevens Act authorizes the state to regulate a vessel in the EEZ, even if it is not registered under state of Alaska laws, if it operates in a fishery in the EEZ for which there "was no fishery management plan in place on August 1, 1996, and the Secretary and the North Pacific Council find that there is a legitimate interest of the state of Alaska in the conservation and management of such fishery." The state could use this authority to prohibit a commercial fishery for HAPC species in the EEZ beyond state waters, provided that the necessary determinations were made under the Magnuson-Stevens Act, Section 306(a)(3). The Council wrote a letter to the ABOF (dated 2/8/01) requesting this action. At a subsequent Board/Council joint protocol committee meeting, Alaska Department of Fish and Game (ADF&G) staff noted that fisheries for corals and sponges would require a Commissioner's permit and indicated that they had no intention of issuing permits for these fisheries in the near future. The ABOF then enacted 5AAC 38.062(e) in 2003, prohibiting retention of corals and sponges within the 3-mile limit.

Some progress was made on Part 2 of the HAPC amendments, which was to develop a more comprehensive and iterative process for HAPC identification and habitat protection involving researchers, stakeholders, and management agencies. A scientific committee was supposed to be tasked to develop a discussion paper that would identify possible management approaches to meet habitat protection objectives and the pros and cons of each. Council staff, with Ecosystem Committee input, were tasked to expand the analysis of HAPC categories and to define the process initiated by submission of a HAPC proposal, through the steps of evaluation, identification, stakeholder involvement, and, where indicated, management actions. Once these actions had been taken, the stakeholder process was to be initiated to better define high-density Gorgonian coral areas and develop appropriate management alternatives. A process was developed for HAPC identification (see discussion paper, http://www.fakr.noaa.gov/npfmc/HAPC/hapcdisc.pdf), and stakeholder meetings were held in Sitka and Yakutat in January 2001. Further development of this issue was put on hold pending the development of this EIS, and no additional meetings occurred prior to the formation of the EFH Committee.

2.2.3 Development of Alternatives for this Analysis

The Council developed alternatives for this analysis using an extensive public process that involved guidance from NMFS and NOAA General Counsel, a formal public scoping period, 15 EFH Committee meetings and work sessions, and numerous meetings of the Council and its Advisory Panel and Scientific and Statistical Committee. This section provides a brief history of actions leading up to the determination of alternatives to be analyzed. A chronology of major events leading up to this analysis is provided in Table 2-2.

In 1999, a coalition of several environmental groups brought suit challenging the agency's approval of the EFH FMP amendments prepared by the Gulf of Mexico, Caribbean, New England, North Pacific, and Pacific Fishery Management Councils (*American Oceans Campaign et al. v. Daley et al.*, Civil Action No. 99-982 (GK) (D.D.C. September 14, 2000). The court found that the agency's decisions on the EFH amendments were in accordance with the Magnuson-Stevens Act, but held that the EAs on the amendments were in violation of NEPA and ordered NMFS to complete new, more thorough NEPA analyses for each EFH amendment in question.

Consequently, NMFS entered into a Joint Stipulation with the plaintiff environmental organizations that called for each affected Council to complete EISs rather than EAs for the action of minimizing adverse effects of fishing to the extent practicable on EFH (see *AOC v. Evans*, Civil No. 99-982 (GK) (D.D.C. December 5, 2001). However, because the court did not limit its criticism of the EAs to efforts to minimize adverse fishing effects on EFH, NMFS decided that the scope of these EISs should address all required EFH components as described in Section 303 (a)(7) of the Magnuson-Stevens Act. Further, NMFS determined that the EISs should not predetermine any conclusions.

On January 22, 2001, NMFS administrator Bill Hogarth issued a memorandum to the Regional Administrators providing guidance for developing EISs for the EFH amendments per the *AOC vs. Daley* court order. The memorandum provided guidance on the actions that must be addressed in the EISs, a notice of intent and scoping, range of alternatives, affected environment, environmental consequences, consideration of new information, and a suggested outline for the EIS. Relative to alternative development, the memorandum noted that NOAA General Counsel and the Department of Justice advised NMFS that the scope of the new EISs must cover all of the required components of FMPs as described in Section 303(a)(7) of the Magnuson-Stevens Act. Thus, the EIS must examine options for designating EFH, as well as minimizing the adverse effects of fishing.

The alternatives for this analysis were developed using the public process described in Section 1.3. The primary components of this process were an official public scoping period, an EFH Committee, scientific background papers and technical assistance, and the Council process (including review by the Council's advisory panel and scientific and statistical committee). The following paragraphs describe the major events that occurred in development of the final list of alternatives.

In June 2001, the Council received a report from NMFS on EFH, the need to prepare an EIS as a result of the lawsuit, the Notice of Intent (NOI) to prepare an EIS, and the scoping meetings that were scheduled. In October 2001, the Council received a report from NMFS on the public scoping meetings and an initial report from the EFH Committee to recommend alternatives based on significant issues identified through the scoping process. In December, the Council reviewed and adopted a preliminary list of EFH and HAPC alternatives developed by the EFH Committee.

In January 2002, NMFS published the final rule implementing the EFH provisions of the Magnuson-Stevens Act (50 CFR 600.805-815). The rule established guidelines to assist the Councils in the description and identification of EFH, the identification of adverse effects to EFH, and the identification of actions required to conserve and enhance EFH.

In March 2002, the EFH Committee held a public workshop in Seattle to review fishery descriptions (gear used, habitat types fished, etc.), discuss potential adverse effects, discuss mitigation tools, and receive a summary of the scientific literature on the effects of fishing gear on habitat. The EFH Committee met again in May 2002, recommended some changes to the EFH and HAPC identification alternatives, and reviewed a preliminary draft spreadsheet analysis that evaluated the effects of all FMP fisheries on EFH. The spreadsheet analysis, which incorporated the information on gear descriptions and habitat types fished, found that groundfish fisheries, particularly trawl fisheries, had some measurable effect on benthic habitat, whereas the scallop, crab, and salmon fisheries (especially) had almost no measurable impacts primarily due to the small footprints of these fisheries relative to available habitats (Witherell 2002, unpublished manuscript).

In June 2002, the Council provided the Committee with guidance for their upcoming work on the selection of alternatives for the EIS. The Council accepted the EFH Committee's recommended changes to the preliminary EFH description and HAPC identification alternatives. The Council also asked staff to prepare a "strawman paper" as a starting point for the Committee's use in developing mitigation alternatives. Staff were also directed to describe within the EIS analysis how each HAPC identification alternative would apply to the following four examples of HAPC: pinnacles and seamounts, gorgonian corals, Bristol Bay Red King Crab habitat (or similar species habitat), and shelf break.

In the summer of 2002, NMFS Alaska Fisheries Science Center staff prepared a preliminary evaluation of the potential adverse effects of fishing on EFH, as required by the EFH final rule (50 CFR 600). The evaluation incorporated a spatial model of fishing intensity in the groundfish fisheries, together with habitat recovery rates. The evaluation model allowed for the relative ranking of fisheries based on their effects on EFH. The results indicated that the highest impacts were due to trawl fisheries and that biogenic shelter was the habitat function primarily affected. The model was reviewed by the Council's Scientific and Statistical Committee in June and October 2002. It was revised with updated information, and the final draft of the evaluation is included as Appendix B.

In August and September 2002, the EFH Committee met to review the preliminary evaluation from which the EFH Committee developed a list of alternatives to minimize the effects of fishing on EFH. The Council reviewed the EFH Committee's recommendations and adopted draft preliminary alternatives. The alternatives to the status quo ranged from only minimizing the effects of the fishing activity found to

have the largest effects (GOA slope rockfish fishery) to minimizing the effects of all fishing activities in areas of sensitive habitats (corals, sponges, sea onions). The Council requested that the EFH Committee provide geographic boundaries for area closures at the next meeting.

In October and November 2002, the EFH Committee met to prepare recommendations on the boundaries of closed areas identified in the preliminary alternatives for minimizing the effects of fishing on EFH. In December 2002, the Council adopted final alternatives for analysis, both for EFH description and HAPC designation, and for minimizing the effects of fishing. The Council also requested that staff develop geographic boundaries for two new alternatives and options for these alternatives, including a system of trawl closures in sponge and coral habitat in the Aleutian Islands (AI) (EFH fishing impact minimization Alternative 5B) and closure of approximately 20 percent of fishable waters to all bottom tending gear (EFH fishing impact minimization Alternative 6).

In February 2003, the Council received a progress report on development of the EIS, including the proposed baseline analysis, and reviewed the alternatives to minimize the effects of fishing. Alternatives 4 and 5 were modified in two ways: (1) it was clarified that the trawl gear restrictions applied only to EBS bottom trawl fisheries, and (2) the closure times for the rotational closure areas were increased to ensure that 20 percent of the habitat would have matured to an "unaffected by fishing" status, assuming a 2-year recovery interval. The Council also provided direction on geographic boundaries, monitoring requirements, and research components of alternatives to minimize the effects of fishing. Further, the Council requested that staff provide a progress report in April, including the conceptual approach to addressing the effects of fishing and the goals and objectives of the mitigation alternatives.

In April 2003, the Council reviewed a draft table of contents for the EIS and RIR, drafts of Chapters 1 and 2, and a report on research and monitoring approaches. The Council received a report from NMFS on application of Alternative 5B methodology to the EBS and GOA to determine whether the approach would merit evaluation as an additional alternative. Staff also reviewed how the Scientific and Statistical Committee's concerns (regarding conceptual approach, goals and objectives, research plan, and analytical components) had been addressed to date. Also at this meeting, the Council directed the EFH Committee to develop and recommend a process for identifying and evaluating potential HAPC areas. The evaluation was to include efficacy, scientific review, and appropriate mitigation measures. The process developed to identify and implement HAPCs would then be incorporated in the EFH EIS. The Council stated that it intended to initiate the HAPC process prior to November 2003 and to implement any HAPCs on the same schedule as EFH FMP amendments. The Council adopted working definitions of marine protected areas (MPAs) to assist this process.

In May 2003, NMFS and the plaintiffs in the *AOC v. Evans* litigation completed a new joint stipulation to amend the schedule for completing the EIS. Under the revised agreement, the draft EIS would be published no later than January 16, 2004, and the final EIS would be published no later than June 1, 2005. NMFS also agreed to consider the possible designation of HAPCs and implementation of any associated management measures. The U.S. District Court for the District of Columbia approved the revised schedule and entered it as an order of the court.

In October 2003, the Council reviewed the preliminary draft EFH EIS and identified preliminary preferred alternatives, as noted in Sections 2.3 and 2.4.

Also in October 2003, the Council decided on details of the HAPC proposal and review process. The Council made specific decisions regarding the HAPC criteria, HAPC priorities, and a stakeholder process (see Appendix J). Further, the Council initiated this process and set HAPC priorities to focus on specific sites within two priority areas. Proposals should focus on sites that fall within (1) seamounts in the EEZ,

named on NOAA charts, that provide important habitat for managed species; and (2) largely undisturbed, high-relief, long-lived hard coral beds, with particular emphasis on those located in the AI, which provide habitat for life stages of rockfish or other important managed species. The Council decided to issue a call for HAPC proposals, with proposals due by January 10, 2004.

NMFS published the draft EIS in January 2004. In response to public comments on the draft EIS, as well as requests from a conservation group and a coalition of Aleutian Islands trawlers, the Council modified the alternatives for minimizing the adverse effects of fishing on EFH. The modifications include the addition of two new options for the Aleutian Islands portion of Alternative 5B, as reflected in the following section.

2.3 Description of the Alternatives

Three separate actions are evaluated in this EIS. These actions would amend the five Alaska FMPs to do the following:

- Describe and identify EFH.[3]
- Identify habitat areas of particular concern within EFH.
- Minimize, to the extent practicable, adverse effects on EFH caused by fishing.

Alternatives considered and analyzed for each action are described in this section.

2.3.1 EFH Description Alternatives

EFH is defined in the Magnuson-Stevens Act as those waters and substrate necessary to fish for spawning, breeding, feeding, or growth to maturity. The regulations specify the following requirements for EFH description.

> FMPs must describe and identify EFH in text that clearly states the habitats or habitat types determined to be EFH for each life stage of the managed species. FMPs should explain the physical, biological, and chemical characteristics of EFH and, if known, how these characteristics influence the use of EFH by the species/life stage. FMPs must identify the specific geographic location or extent of habitats described as EFH. FMPs must include maps of the geographic locations of EFH or the geographic boundaries within which EFH for each species and life stage is found....[also] FMPs must demonstrate that the best scientific information available was used in the description and identification of EFH, consistent with national standard 2 (50 CFR 600).

The EFH Final Rule (50 CFR 600) specifies the following approach to gather and organize the data necessary for identifying EFH. Information is to be described in levels, and all levels should be used to identify EFH, if information exists. The goal of this procedure is to include as many levels of analysis as possible within the constraints of the available data. Councils should try to obtain enough data to describe habitat at the highest level of detail (i.e., Level 4).

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[3]Although the Magnuson-Stevens Act uses the term "describe and identify essential fish habitat," NMFS, the Council, and many stakeholders often use the term "designate" and its derivatives (designation, designated, etc.) to refer to the habitat areas described and identified as EFH in FMPs. To some users, "designate" implies establishing specific geographic boundaries, whereas "describe" does not and, therefore, seems less concrete. This EIS predominantly uses "describe and identify" and their derivatives, but occasionally uses "designate" and its derivatives to convey the identification of specific habitat areas. The EIS uses these terms synonymously throughout.

Level 1: Distribution data are available for some or all portions of the geographic range of the species. At this level, only distribution data are available to describe the geographic range of a species (or life stage). Distribution data may be derived from systematic presence/absence sampling and/or may include information on species and life stages collected opportunistically. In the event that distribution data are available only for portions of the geographic area occupied by a particular life stage of a species, habitat use can be inferred based on distributions among habitats where the species has been found and on information about its habitat requirements and behavior. Habitat use may also be inferred, if appropriate, based on information on a similar species or another life stage.

Level 2: Habitat-related densities of the species are available. At this level, quantitative data (i.e., density or relative abundance) are available for the habitats occupied by a species or life stage. Because the efficiency of sampling methods is often affected by habitat characteristics, strict quality assurance criteria should be used to ensure that density estimates are comparable among methods and habitats. Density data should reflect habitat use, and the degree that a habitat is used is assumed to be indicative of habitat value. When assessing habitat value on the basis of fish densities in this manner, temporal changes in habitat availability and use should be considered.

Level 3: Growth, reproduction, or survival rates within habitats are available. At this level, data are available on habitat-related growth, reproduction, and/or survival by life stage. The habitats contributing the most to productivity should be those that support the highest growth, reproduction, and survival of the species (or life stage).

Level 4: Production rates by habitat are available. At this level, data are available that directly relate the production rates of a species or life stage to habitat type, quantity, quality, and location. Essential habitats are those necessary to maintain fish production consistent with a sustainable fishery and the managed species' contribution to a healthy ecosystem.

The regulations specify that Level 1 information, if available, should be used to identify the geographic range of the species at each life stage. If only Level 1 information is available, distribution data should be evaluated (e.g., using a frequency of occurrence or other appropriate analysis) to identify EFH as those habitat areas most commonly used by the species. Levels 2 through 4 information, if available, should be used to identify EFH as the habitats supporting the highest relative abundance; growth, reproduction, or survival rates; and/or production rates within the geographic range of a species.

Existing EFH descriptions (EFH Description Alternative 2) include reference to Level 0, and Alternative 2 is the only alternative to reference Level 0 information. The Alaska Region's EFH Team established Level 0 in 1999 to address concerns over how to identify EFH in a data-limited environment. The AKR EFH Team believed that the EFH Interim Rule did not adequately provide the level of definition needed for Alaska EFH resources. Further discussion on Level 0 is provided below in Section 2.3.1.2.

EFH description Alternatives 3, 4, 5, and 6 do not include Level 0 information and use the level of information definitions (Levels 1 to 4) defined by the EFH Final Rule, as outlined above. The EFH Final Rule level of information definitions were changed to allow the use of habitat information in data-limited situations, such as inference.

Additional habitat associations, reproductive traits, and predator/prey information for each EFH example species are provided in Tables 2-3 to 2-5.

EFH Scientific Information

EFH descriptions are interpretations of the best scientific information. In support of this information, a thorough review of FMP species is contained in Section 3.2.1, Biology, Habitat Usage, and Status of Magnuson-Stevens Act Managed Species, and is detailed by life history stage in Appendix F: EFH Habitat Assessment Reports.

Another important scientific reference, specific to Pacific salmon, is the state of Alaska's *Catalog of Waters Important for Spawning, Rearing, or Migration of Anadromous Fishes* (ADF&G 1998a). The catalog covers the entire state of Alaska and focuses on freshwater and estuarine areas used by anadromous fishes. The catalog is divided into six regional areas (see Figure 2-2). There are limitations to the catalog, and many areas in Alaska have not been completely surveyed.

EFH Text Descriptions

The EFH Final Rule (50 CFR 600.815(a)(1)(iv)(B)) states the following:

> FMPs must describe EFH in text, including reference to the geographic location or extent of EFH using boundaries such as longitude and latitude, isotherms, isobaths, political boundaries, and major landmarks. If there are differences between the descriptions of EFH in text, maps, and tables, the textual description is ultimately determinative of the limits of EFH...the boundaries of EFH should be static.

The vastness of Alaska and the large number of individual fish species managed by FMPs make it challenging to describe EFH by text using static boundaries. To address this challenge, NMFS refers to the boundaries as defined by each Fishery Management Unit (FMU) for each FMP. Appendix D, page D-1, lists the specific FMU boundaries. FMU boundaries are known geographic locations within the waters of Alaska, and reference is included in each EFH text description in the appendix.

EFH Map Description

The EFH regulations specify that FMPs must include maps that display, within the constraints of available information, the geographic location of EFH or the geographic boundaries within which EFH for each species and life stage is found. A GIS analytical system was used to delineate EFH map descriptions for this analysis. EFH descriptive maps visually present the EFH text description and compliment the textual descriptions.

EFH Alternative Methodology and Analytical Approach

Each EFH description alternative has a specific methodology and analytical approach to describe EFH. To assess each alternative and evaluate the merits of one approach compared to another, it is important to understand each alternative. At the beginning of each EFH description alternative in Chapter 2, the basic methodology, objective, and rationale for each alternative are provided. Appendix H offers more details about specific analytical approaches used for each EFH description alternative.

The following sections provide a description of alternatives, evaluated in this analysis, for the description and identification of EFH. This EIS includes alternatives for describing EFH for every managed species and life stage for which sufficient information is available. As specified in the EFH regulations, if there is no information on a given species or life stage, and habitat use cannot be inferred from other means, EFH should not be described (50 CFR 600.815(a)(1)(iii)(B)).

To illustrate the differences among the EFH description alternatives and not lengthen this chapter with more than 100 EFH text and map descriptions, the following sections use one example species for each of the five FMPs to represent the description and identification of EFH. EFH descriptions and identifications for the remaining species are provided in Appendix D. The rationale for choosing each particular species to illustrate differences among the alternatives includes the following:

- Each species is a major target species managed by that FMP.
- Adequate information (Level 1 or higher) is available for at least one life history stage of the species.
- The five species cover a wide range of habitat types and geographic areas.
- The alternatives for minimizing adverse effects of fishing include EFH for these species.

2.3.1.1 Alternative 1: No EFH Description (No Action)

Under this alternative, the FMPs would be amended to remove any description or identification of EFH.

2.3.1.2 Alternative 2: Status Quo – Existing EFH General Distribution

Under this alternative, the existing description and identification of EFH contained in the FMPs would remain unchanged. EFH is the general distribution for a species life history stage, if presence/absence information is available. General distribution is used to describe EFH whether or not higher levels of information exist and are provided under all stock conditions. General distribution is a subset of a species range, encompassing the area that contains about 95 percent of the occurrence for a particular species' life history stage.

In January 1999, these EFH descriptions were made under FMP amendments 55/55/8/5/5. EFH is the text description only, and any mapped areas are only attempts to depict general distribution.

Additionally, the EFH Core Team (a multi-discipline panel consisting of NMFS Alaska Region and Alaska Fisheries Science Center staff) determined that for certain species there was some information for a particular life stage, but not enough to describe EFH using Level 1 information. In these cases, a Level 0 was established to describe EFH for those life stages where EFH could be inferred from another life stage or a species with similar habitat characteristics. Further, Level 0 was divided into three sub-categories: 0_a, 0_b, and 0_c. Level 0 is summarized below, and the levels are listed in the EFH descriptions for each life stage in Alternative 2.

> Classification of EFH Level 0 used in the Alaska Region EFH determinations was based on available information.
>
> | | |
> |---|---|
> | Level 0 | No systematic sampling has been conducted for this species and life stage; species may have been caught opportunistically in small numbers during other research. |
> | Level 0_a | Some information exists on a species' life stage upon which to infer general distribution. |
> | Level 0_b | No information exists on the life stage, but there is some information on a similar species or adjacent life stage from which to infer general distribution. |
> | Level 0_c | No information exists on the actual species' life stage, no information is available on a similar species or adjacent life stages, or complexity of a species stock structure prohibits inference of general distribution. |

As discussed above, Alternative 2 is the only alternative to reference Level 0 information.

Objective

Existing EFH descriptions were analyzed through an environmental assessment process that met the objectives of the Magnuson-Stevens Act and EFH Interim Final Rule guidelines. Specifically, the objective was to identify EFH for each FMP species, by particular life stage and using best scientific information and technology, as only those waters and substrates necessary to the species.

Methodology

The analysis examined fishery observer and catch data for BSAI Groundfish, GOA Groundfish, BSAI Crab, and Scallop FMP fisheries (Fritz et al. 1998), NMFS survey records, and, where appropriate, ADF&G survey information to select approximately 95 percent of occurrences where one would reasonably (with high probability) expect to find a certain life stage of that species. Where this information exists, the area described by these data is EFH. The EFH areas were reviewed by scientific stock assessment authors for accuracy. EFH maps were hand-drawn over a template of the FMP area, either BSAI or GOA. Text descriptions were developed for each FMP by life stage (see the 1999 EFH Environmental Assessment [EA] for more information).

For Salmon FMP species, the analysis focuses on two areas: marine and freshwater. Marine salmon EFH was generally described to include all marine waters from the mean higher high water line to the limits of the EEZ, since scientific information indicates that salmon are 1) distributed throughout all marine waters during late juvenile and adult life stages and 2) found nearshore and along coastal migration corridors as early juvenile life stages out-migrate and adult life stages return to and from freshwater areas, respectively. Freshwater areas used by egg, larvae, and returning adult salmon will be described as those areas indexed by the state of Alaska's *Catalog of Waters Important for the Spawning, Rearing, or Migration of Anadromous Fishes* (ADF&G 1998a), specifically Pacific salmon species. Freshwater salmon systems are generally defined as those areas above mean higher tide to the upper limits of those freshwater systems supporting salmon and may include contiguous wetland areas, such as those areas hydrologically connected to the main water source via access channels to an adjacent river, stream, lake, pond, etc.

Rationale

Alternative 2 incorporates basic rationales to describe EFH as general distribution. These rationales are found in the 1999 EFH EA, Section 6.0, pages 46 to 48, and are summarized as follows:

- Areas of higher concentration, based on current survey and catch information, do not adequately address unpredictable annual differences in spatial distributions of a life stage, nor changes due to long-term shifts in oceanographic regimes.
- All habitats occupied by a species contribute to production at some level.
- A stock's long-term productivity is based on both high and low levels of abundance, and the entire general distribution may be required during times of high abundance.
- Observed concentrations or densities do not necessarily reflect all habitat required to maintain healthy stocks within the ecosystem.
- Using best scientific information available in a risk-averse fashion and employing an ecosystem approach suggest that, unless the information indicates otherwise, the more inclusive general distribution should be used to describe EFH.
- Density knowledge alone (Level 2 information and higher) would be insufficient to determine that habitat encompassed by general distribution is not essential to maintain healthy stocks and ecosystems and to sustain productive fisheries.
- A broad geographic distribution of essential habitats provides the prey species important for growth, maturation, and diversity that may be required in times of changing environmental conditions.

2.3.1.2.1 GOA Groundfish FMP

The following is an example of how Alternative 2 would describe EFH for species included in the FMU of the GOA Groundfish FMP. In this case, the example is EFH description for all life stages of GOA Pacific ocean perch under Alternative 2. A map showing the location of EFH for adults and late juveniles of this species under this alternative is provided as Figure 2-3.

Eggs (internal incubation, ~90 days)—No EFH Definition Determined
Internal fertilization and incubation. Incubation is assumed to occur during the winter months.

Larvae (duration 60 to 180 days)—Level 0_a
Pelagic waters of the inner, middle, and outer continental shelf, the upper and lower slope and the basin areas extending to the seaward boundary of the EEZ of the GOA from Dixon Entrance to 170° W during the spring and summer months.

Early Juveniles (larval stage to 3 years)—Level 0_a
Initially pelagic, then demersal in very rocky areas of the inner continental shelf of the GOA from Dixon Entrance to 170° W.

Late Juveniles (3 to 10 years)—Level 1
Areas of cobble, gravel, mud, sandy mud, and muddy sand along the inner, middle, and outer continental shelf and upper slope areas, shallower than for adults, and the middle to lower portion of the water column of the GOA from Dixon Entrance to 170° W. Feeding areas are those containing euphausiids.

Adults (10+ years)—Level 1
Areas of cobble, gravel, mud, sandy mud, or muddy sand along the outer continental shelf and upper slope areas from180 to 420 m (actual depths sampled) of the GOA from Dixon Entrance to 170° W. Feeding areas are those containing euphausiids. Areas of high concentrations tend to vary seasonally and may be related to spawning behavior. In summer, adults inhabit shallower depths 180 to 250 m; in the fall, they migrate farther offshore 300 to 420 m.

2.3.1.2.2 BSAI Groundfish FMP

The following is an example of how Alternative 2 would describe EFH for species included in the FMU of the BSAI Groundfish FMP. In this case, the example is EFH description for all life stages of BSAI Pacific cod under Alternative 2. A map showing the location of EFH for adults and late juveniles of this species under this alternative is provided as Figure 2-4.

Eggs (duration 15 to 20 days)—Level 0_a
Areas of mud and sand on the inner, middle, and outer continental shelf and the upper slope throughout the eastern BSAI in winter and spring.

Larvae (duration unknown)—Level 0_a
Epipelagic waters throughout the eastern BSAI regions in winter and spring.

Early Juveniles (up to 2 years)—Level 0_a
Areas of mud and sand and the water column on the inner and middle continental shelf of the eastern BSAI, particularly those with mysids, euphausiids, and shrimp.

Late Juveniles (2 to 4 years)—Level 1
Areas of soft substrate (clay, mud, and sand) and the lower portion of the water column on the inner, middle, and outer continental shelf areas of the eastern BSAI, particularly those with mysids, euphausiids, shrimp, pollock, flatfish, crab, and fishery discards.

Adults (4+ years old)—Level 2
Areas of mud and sand along the inner, middle, and outer continental shelf up to 500 m along with the lower portion of the water column of the eastern BSAI. Spawning occurs from January through May near the bottom across broad areas of the shelf, but predominately along the outer shelf between 100 and 200 m in the EBS and throughout the area less than 200 m from the AI. After spawning, the mature population spreads out throughout the shelf in the eastern BSAI, but with concentrations along the outer shelf northwest of the Pribilof Islands and along the outer and middle shelf areas northwest of the Alaskan Peninsula and into Bristol Bay. Feeding areas are those containing pollock, flatfish, and crab.

2.3.1.2.3 BSAI King and Tanner Crab FMP

The following is an example of how Alternative 2 would describe EFH for species included in the FMU of the BSAI king and Tanner crab FMP. In this case, the example is EFH description for all life stages of BSAI golden king crab under Alternative 2. Maps showing the locations of EFH for eggs and late juvenile/mature crabs under this alternative are provided as Figures 2-5 and 2-6, respectively.

Eggs (Levels 0_c, 1, and 2)—No EFH Definition Determined for the Northern District Stock
General distribution (Level 1) and density (Level 2) of egg-bearing female golden king crabs are used to identify EFH for the Sequam Pass stock. EFH for the egg life stage of the Adak and Priblilof Islands stocks is based on general distribution (Level 1) of the egg-bearing female crabs (see also Mature).

Larvae (Level 0_c)—No EFH Definition Determined
Information to define EFH of golden king crab larvae is not available for the Seguam Pass, Adak, Pribilof Islands, or Northern District stocks.

Early Juveniles (Level 0_c)—No EFH Definition Determined
Information to define EFH of early juvenile golden king crabs is not available for the Seguam Pass, Adak, Pribilof Islands, or Northern District stocks.

Late Juveniles (Levels 0_c, 1 and 2)—No EFH Definition Determined for the Northern District Stock
Late juvenile golden king crabs are found throughout the depth range of the species. Abundance of late juvenile crab increases with depth. These crab are most abundant at depths greater than 548 m. EFH for late juvenile golden king crabs is based on general distribution (Level 1) and density (Level 2) of this life stage for the Sequam Pass stock. General distribution (Level 1) of late juvenile golden king crabs is used to identify EFH for the Adak and Pribilof Islands stock. Information to define EFH is not available for late juvenile golden king crabs of the Northern District stock.

Mature (Levels 0_c and 2)—No EFH Definition Determined for the Northern District Stock
Mature golden king crabs occur at all depths within their distribution. Males tend to congregate in somewhat shallower waters than females, and this segregation appears to be maintained throughout the year. Legal male crabs are most abundant between 274 and 639 m. Abundance of sub-legal

males increases at depth greater than 364 m. Female abundance is greatest at intermediate depths between 274 and 364 m. General distribution (Level 1) and density (Level 2) of mature golden king crabs are used to identify EFH for the Sequam Pass, Adak, and Pribilof Islands stocks. Information is not available to define EFH for mature golden king crabs of the Northern District stock.

2.3.1.2.4 Alaska Scallop FMP

The following is an example of how Alternative 2 would describe EFH for species included in the FMU of the Alaska Scallop FMP. In this case, the example is EFH description for all life stages of weathervane scallops under Alternative 2. Maps showing the locations of EFH for adults and late juveniles of this species under this alternative are provided as Figures 2-7 and 2-8.

Eggs (several days)—Level 0_a
Demersal waters of the inner and middle continental shelf of the GOA and to a lesser extent in the BSAI. Eggs are released in the late spring and early summer.

Larvae (2 to 3 weeks)—Level 0_a
Pelagic waters along the inner, middle, and outer continental shelf of the GOA west of Dixon entrance, extending into the BSAI.

Juveniles (to 3 years)—Level 1
Areas of clay, mud, sand, and gravel along the mid-continental shelf of the BSAI and GOA.

Adults (3+ years)—Level 2
Areas of clay, mud, sand, and gravel along the mid-continental shelf of the GOA and BSAI. Areas of concentration are from 40 to 130 m. Scallop beds are generally elongated in the direction of current flow.

2.3.1.2.5 Alaska Salmon FMP

The following is an example of how Alternative 2 would describe EFH for species included in the FMU of the Salmon FMP. In this case, the example is EFH description for all life stages of Chinook salmon under Alternative 2. A map showing the location of EFH for freshwater adults of this species under this alternative is provided as Figure 2-9.

Eggs and Larvae—Levels 1 and 2
Those portions of fresh waters within the bounds of ordinary high water where Chinook salmon currently or historically occur that are accessible to adult Chinook salmon (or could be cost-effectively made accessible) and that have bottom substrate, water quality, and seasonal flow adequate for the incubation and development of Chinook salmon eggs and larvae. Impaired areas with potential for cost-effective restoration are also EFH for Chinook salmon. Eggs and larvae require more than 200 days from July to May for incubation in intragravel flows.

Juveniles (freshwater)—Levels 1 to 3
Those portions of fresh waters in Alaska within the bounds of ordinary high water where Chinook salmon currently or historically occur, that are accessible to juvenile Chinook salmon (or could be cost-effectively made accessible), and that provide adequate water quality and productivity conditions for seasonal or year-round rearing or migration for juvenile Chinook salmon. Impaired areas with potential for cost-effective restoration are also EFH for Chinook salmon. Juvenile Chinook salmon require year-round rearing habitat and also migration habitat from April to September to provide access to the sea.

Juveniles (estuarine)—Levels 1 and 2
The salinity transition zone (ecotone) and contiguous intertidal and nearshore habitats below mean higher high tide in Alaska where Chinook salmon currently or historically occur. Chinook salmon smolts and post-smolt juveniles may be present in these estuarine habitats from April through September.

Juveniles (marine)—Levels 1 and 2
Marine waters from Dixon Entrance to the Bering Straits, extending from the intertidal area to the limits of the U.S. EEZ. Juvenile Chinook salmon are present in this habitat from April until annulus formation in January or February of their first winter at sea.

Immature and Maturing Adults (marine)—Levels 1 and 2
Marine waters below mean higher high tide from Dixon Entrance to the Bering Straits, extending from the intertidal area to the limits of the EEZ. Immature Chinook salmon use this marine habitat year-round. Maturing fish generally are considered to be in their ultimate year of life, and thus, use the habitat from January until September, by which time they have entered freshwater or moved out of the marine EFH in Alaska.

Adults (freshwater)—Levels 1 to 3
Those portions of fresh waters in Alaska within the bounds of ordinary high water where Chinook salmon currently or historically occur, that are accessible to adult Chinook salmon (or could be cost-effectively made accessible), and that provide suitable water quality, migration access, holding areas, and spawning substrates and flow regimes. Impaired areas with potential for cost-effective restoration are also EFH for Chinook salmon. Adult Chinook salmon use such freshwater habitats in Alaska from April through September.

2.3.1.3 Alternative 3 (Preliminary Preferred Alternative): Revised General Distribution

EFH is the general distribution of a species described by life stage. General distribution is a subset of a species population and is 95 percent of the population for a particular life stage, if life history data are available for the species. Where information is insufficient and a suitable proxy cannot be inferred, EFH is not described. General distribution is used to describe EFH for all stock conditions whether or not higher levels of information exist, because the available higher level data are not sufficiently comprehensive to account for changes in stock distribution (and thus habitat use) over time.

Alternative 3 describes EFH for FMP-managed species by life stage as general distribution using new guidance from the EFH Final Rule, such as the updated EFH Level of Information definitions. Alterative 3 uses new analytical tools and incorporates recent scientific information for each life history stage from updated scientific habitat assessment reports (see Appendix F). EFH descriptions include both text and a map, if information is available for a species' particular life stage. Alternative 3 is risk averse, supported by

scientific rationale, and accounts for changing oceanographic conditions, regime shifts, and the seasonality of migrating fish stocks.

Objective
The objective of this alternative is to describe EFH for each life stage using the best available scientific information, i.e. only those waters and substrates where the species is known to associate or recruit in scientific surveys and commercial fishery catches. EFH is described as 95 percent of the population where the species life stage has been recruited to the survey, investigated through research, officially observed, or reported in a vessel catch log.

Methodology
In addition to scientific information sources analyzed in Alternative 2, the Alternative 3 analysis focused on two significant fishery geographic information data resources: survey (Resource Assessment and Conservation Engineering Division [RACE]) and observer (NORPAC). For adult and late juvenile life stages, each data set was analyzed for 95 percent of the total accumulated population for the species using GIS. For eggs and larvae, the EFH description is based on presence/absence data from surveys. EFH is identified as the areas where eggs and larvae are most commonly encountered in those surveys, which is the best available information regarding habitat use for those life stages. EFH shape files were developed based on these data sets.

For adult and late juvenile life stages of BSAI Groundfish, GOA Groundfish, BSAI Crab, and Scallop FMP species, fishery catch per unit of effort (CPUE) data from the NMFS Observer database (NORPAC, 1990 to 2001) and NMFS trawl survey data from RACE, 1987 to 2002 and, where appropriate, ADF&G survey data were analyzed to estimate the population distribution of each species. Where this information exists, the area described by these data is identified as EFH. The analyzed EFH data and area were further reviewed by scientific stock assessment authors for accuracy. This review ensures that any outlying areas not considered were included, and errors in the data or described EFH area were removed.

For Salmon FMP species, the analysis is broken into three parts: marine, nearshore, and freshwater. Marine and nearshore salmon EFH is generally described to include all marine waters from the mean higher tide line to the limits of the EEZ since science recognizes that salmon are 1) distributed throughout all marine waters during late juvenile and adult life stages, and 2) found nearshore and along coastal migration corridors as early juvenile life stages out migrate and adult life stages return to and from freshwater areas, respectively. Freshwater areas used by egg, larvae, and returning adult salmon will be analyzed as those areas indexed by the state of Alaska's *Catalog of Waters Important for the Spawning, Rearing, or Migration of Anadromous Fishes* (ADF&G 1998a), specifically Pacific salmon species. Freshwater salmon systems are generally defined as those areas above mean higher tide to the upper limits of those freshwater systems supporting salmon and may include contiguous wetland areas, such as those areas hydrologically connected to the main water source via access channels to an adjacent river, stream, lake, pond, etc.

Rationale
Alternative 3 incorporates the same basic rationales to describe EFH as in Alternative 2.

2.3.1.3.1 GOA Groundfish FMP

The following is an example of how Alternative 3 would describe EFH for species included in the FMU of the GOA Groundfish FMP. In this case, the example EFH description is for all life stages of GOA Pacific ocean perch under Alternative 3.

Eggs—No EFH Description Determined
Insufficient information is available.

Larvae
EFH for larval Pacific ocean perch is the general distribution area for this life stage, located in the middle to lower portion of the water column along the inner shelf (0 to 50 m), middle shelf (50 to 100 m), outer shelf (100 to 200 m), and upper slope (200 to 500 m) throughout the GOA as depicted in Figure 2-10.

Early Juveniles—No EFH Description Determined.
Insufficient information is available.

Late Juveniles
EFH for late juvenile Pacific ocean perch is the general distribution area for this life stage, located in the middle to lower portion of the water column along the inner shelf (0 to 50 m), middle shelf (50 to 100 m), outer shelf (100 to 200 m), and upper slope (200 to 500 m) throughout the GOA wherever there are substrates consisting of cobble, gravel, mud, sandy mud, or muddy sand, as depicted in Figure 2-10.

Adults
EFH for adult Pacific ocean perch is the general distribution area for this life stage, located in the lower portion of the water column along the outer shelf (100 to 200 m) and upper slope (200 to 500 m) throughout the GOA wherever there are substrates consisting of cobble, gravel, mud, sandy mud, or muddy sand, as depicted in Figure 2-10.

2.3.1.3.2 BSAI Groundfish FMP

The following is an example of how Alternative 3 would describe EFH for species included in the FMU of the BSAI Groundfish FMP. In this case, the example EFH description is for all life stages of BSAI Pacific Cod under Alternative 3.

Eggs—No EFH Description Determined
Scientific information notes the rare occurrence of Pacific cod eggs.

Larvae
Scientific information notes the rare occurrence of Pacific cod larvae.

Early Juveniles—No EFH Description Determined
Insufficient information is available.

Late Juveniles
EFH for late juvenile Pacific cod is the general distribution area for this life stage, located in the lower portion of the water column along the inner (0 to 50 m), middle (50 to 100 m), and outer (100 to 200 m) shelf throughout the BSAI wherever there are soft substrates consisting of sand, mud, sandy mud, and muddy sand, as depicted in Figure 2-11.

Adult
EFH for adult Pacific cod is the general distribution area for this life stage, located in the lower portion of the water column along the inner (0 to 50 m), middle (50 to 100 m), and outer (100 to 200 m) shelf throughout the BSAI wherever there are soft substrates consisting of sand, mud, sandy mud, muddy sand, and gravel, as depicted in Figure 2-11.

2.3.1.3.3 BSAI King and Tanner Crab FMP

The following is an example of how Alternative 3 would describe EFH for species included in the FMU of the BSAI King and Tanner Crab FMP. In this case, the example EFH description is for all life stages of BSAI Golden King Crab under Alternative 3.

Eggs
EFH for Golden king crab eggs is inferred from the general distribution of egg-bearing female crab (see Adults).

Larvae—No EFH Description Determined
Insufficient information is available.

Early Juveniles—No EFH Description Determined
Insufficient information is available.

Late Juveniles
EFH for late juvenile Golden king crab is the general distribution area for this life stage, located in bottom habitats along the upper slope (200 to 500 m), intermediate slope (500 to 1,000 m), lower slope (1,000 to 3,000 m), and basins (more than 3,000 m) of the BSAI where there are high-relief living habitats such as coral and vertical substrates such as boulders, vertical walls, ledges, and deep water pinnacles, as depicted in Figure 2-12.

Adults
EFH for adult Golden king crab is the general distribution area for this life stage, located in bottom habitats along the outer shelf (100 to 200 m), upper slope (200 to 500 m), intermediate slope (500 to 1,000 m), lower slope (1,000 to 3,000 m), and basins (more than 3,000 m) of the BSAI where there are high-relief living habitats such as coral and vertical substrates such as boulders, vertical walls, ledges, and deep water pinnacles, as depicted in Figure 2-12.

2.3.1.3.4 Alaska Scallop FMP

The following is an example of how Alternative 3 would describe EFH for species included in the FMU of the Alaska Scallop FMP. In this case, the example EFH description is for all life stages of weathervane scallops under Alternative 3.

Eggs—No EFH Description Determined
Insufficient information is available.

Larvae—No EFH Description Determined
Insufficient information is available.

Early Juveniles—No EFH Description Determined
Insufficient information is available.

Late Juveniles
EFH for late juvenile weathervane scallops is the general distribution area for this life stage, located in the sea floor along the middle (50 to 100 m) and outer (100 to 200 m) shelf in concentrated areas of the GOA and BSAI where there are substrates of clay, mud, sand, and gravel that are generally elongated in the direction of current flow, as depicted in Figure 2-13.

Adults
EFH for adult weathervane scallops is the general distribution area for this life stage, located in the sea floor along the middle (50 to 100 m) and outer (100 to 200 m) shelf in concentrated areas of the GOA and BSAI where there are substrates of clay, mud, sand, and gravel that are generally elongated in the direction of current flow, as depicted in Figure 2-13.

2.3.1.3.5 Alaska Salmon FMP

The following is an example of how Alternative 3 would describe EFH for species included in the FMU of the Salmon FMP. In this case, the example EFH description is for all life stages of Chinook salmon under Alternative 3. NOTE: Select figures (maps) concentrate on freshwater areas of the Southeast Alaska Region to provide detail for this review. EFH descriptive maps will be completed for all other regions of Alaska.

Freshwater Eggs
EFH for Chinook salmon eggs is the general distribution for this life stage, located in gravel substrates in those waters identified by the state of Alaska's *Catalog of Waters Important for the Spawning, Rearing, or Migration of Anadromous Fishes* (ADF&G 1998a) (see Figure 2-14).

Freshwater Larvae and Juveniles
EFH for larval and juvenile Chinook salmon is the general distribution area for this life stage, located in those waters identified by the state of Alaska's *Catalog of Waters Important for the Spawning, Rearing, or Migration of Anadromous Fishes* (ADF&G 1998a) and contiguous rearing areas within the boundaries of ordinary high water. Juvenile Chinook salmon out-migrate from freshwater areas in April toward sea and may spend up to a year in a major tributaries or rivers, such as the Kenai, Yukon, Taku, and Copper Rivers (see Figure 2-14).

Estuarine Juveniles
Estuarine EFH for juvenile Chinook salmon is the general distribution area for this life stage, located in estuarine areas, as identified by the salinity transition zone (ecotone) and the mean higher tide line, within nearshore waters. Chinook salmon smolts and post-smolt juveniles may be present in these estuarine habitats from April through September (see Figure 2-15).

Marine Juveniles
Marine EFH for juvenile Chinook salmon is the general distribution area for this life stage, located in all marine waters off the coast of Alaska from the mean higher tide line to the 200-nm limit of the EEZ, including the GOA, EBS, Chukchi Sea, and Arctic Ocean. Juvenile marine Chinook salmon are at this life stage from April until annulus formation in January or February during their first winter at sea (see Figure 2-15).

Marine Immature and Maturing Adults
EFH for immature and maturing adult Chinook salmon is the general distribution area for this life stage, located in marine waters off the coast of Alaska and ranging from the mean higher tide line to

the 200-nm limit of the U.S. EEZ, including the GOA, EBS, Chukchi Sea, and Arctic Ocean (see Figure 2-15).

Freshwater Adults
EFH for adult Chinook salmon is the general distribution area for this life stage, located in fresh waters identified in the state of Alaska's *Catalog of Waters Important for the Spawning, Rearing, or Migration of Anadromous Fishes* (ADF&G 1998a) wherever there are spawning substrates consisting of gravels from April through September (see Figure 2-14).

2.3.1.4 Alternative 4: Presumed Known Concentrations

EFH is described as areas of presumed known concentrations of each life stage of each FMP species. EFH is described using the highest level of information available for each life history stage. If no information is available, then EFH is not described. If information is only available to delineate the presence or absence for a particular life history stage, then EFH is described as general distribution. If information is sufficient to further refine the species population through analysis, then EFH is described as known concentrations.

For most managed species in Alaska, however, the highest level of information known is Level 2, which is only described using a refinement of the analysis used in Alternative 3. Sufficient information to describe EFH using even higher levels of information, such as Level 3, is limited to a few life stages of salmon and exists mostly where this habitat has been documented by field observation. In these instances, EFH at Level 3 is for only the freshwater adult life stage of the salmon species and is described as only those areas that are linked to productivity and/or production rates for that life stage, such as spawning areas. [See the table, Highest Level of Information Available for Each of the Five EFH Example Species by Life History Stage, at the end if this section.]

To develop Level 2 information, the analytical approach used for Alternative 3 was refined to encompass 75 percent of the species population. A percentile of 75 percent was chosen as to be narrower than 95 percent and not as restrictive as the upper two-thirds known concentration percentile (66 percent) as defined in the original EFH EA. The EFH EA in 1999 did not choose known concentration as the preferred alternative; however, discussion is located in the EFH EA document for reference.

Alternative 4 describes EFH for FMP-managed species by life stage using new guidance from the EFH Final Rule, such as the updated EFH Level of Information definitions. Alternative 4 uses new analytical tools and incorporates recent scientific information for each life history stage from updated scientific habitat assessment reports (see Appendix F). EFH descriptions include both text and a map, if information is available for a species particular life stage. EFH description maps for known concentrations depict EFH in more discrete areas for those species and life stages for which sufficient information exists.

The major difference between Alternatives 3 and 4, even when higher levels of information are available for a particular species life stage, is that Alterative 3 describes EFH for the life stage as the general distribution, while Alternative 4 describes EFH as the presumed known concentration.

Objective
The objective is to describe EFH for each particular life stage using best scientific information for only those waters and substrates where the species is concentrated for all instances where data are available to make these determinations.

Methodology

Scientific information sources used in the Alternative 4 analysis focused on two significant fishery data sources: survey (RACE) and catch (NORPAC). Each data set was analyzed for 75 percent of the total accumulated population for the species using GIS. An EFH shape file was developed as the intersection of these data sets.

For BSAI Groundfish, GOA Groundfish, BSAI Crab, and Scallop FMP species, fishery CPUE data from the NMFS Observer database (NORPAC, 1990 to 2001) and NMFS trawl survey data from RACE, 1987 to 2002, and, where appropriate, ADF&G survey data were analyzed to estimate the population distribution of each species. Where sufficient information exists, the area described by this data is EFH. The analyzed data and area were further reviewed by scientific stock assessment authors for accuracy. This review ensures that any outlying areas not considered were included, and errors in the data or described EFH area were removed. Alternative 4 does not include egg and larvae analysis because sufficient survey information does not exist to identify known concentrations of early life stages throughout Alaska waters.

For Salmon FMP species, the analysis is broken into three parts: marine, nearshore, and freshwater. Marine and Nearshore Salmon EFH is generally described as to include all marine waters from the mean higher tide line to the limits of the EEZ, since science recognizes that salmon are 1) distributed throughout all marine waters during late juvenile and adult life stages, and 2) found nearshore and along coastal migration corridors as early juvenile life stages outmigrate and adult life stages return to and from freshwater areas, respectively. Freshwater areas used by egg, larvae, and returning adult salmon will be analyzed as those areas indexed by the state of Alaska *Catalog of Waters Important for the Spawning, Rearing, or Migration of Anadromous Fishes* (ADF&G 1998a), specifically Pacific salmon species. Freshwater salmon systems are generally defined as those areas above mean higher tide to the upper limits of those freshwater systems supporting salmon and may include contiguous wetland areas, such as those areas hydrologically connected to the main water source via access channels to an adjacent river, stream, lake, pond, etc.

Higher levels of habitat information exist in known spawning areas. Therefore, EFH for adult freshwater salmon is those areas where salmon are known to concentrate or spawn as compared to just those areas where freshwater adult salmon are present.

Rationale

Alternative 4 incorporates the basic rationales for Level 1 information described for Alternative 3. Further, Alternative 4 describes EFH using higher levels of concentration, if known. Specifically for salmon the following apply:

- Concentrations reflect points where fish become concentrated on migration routes from the open ocean to fresh water (e.g., Unimak Pass) and may not indicate exceptional habitats necessary for rearing and maturing.
- Research has identified one area off Prince William Sound to Kodiak Island as a possible area of concentration of chum salmon in summer.
- Freshwater concentrations of salmon reflect locations of specific habitats for spawning, rearing, and migration that are patchily distributed on a finer scale (at the reach level) within watersheds.
- Areas of spawning have been identified for a small number of specific river systems that have been intensively surveyed, primarily in Southeast (Region I), Southcentral (Region II), and Southwestern (Region III) Alaska.

Highest Level of Information Available for Each of the Five Example Species by Life Stage.

EFH Species	Eggs	Freshwater Larvae and Juveniles*	Larvae	Estuarine Juvenile*	Marine Juvenile*	Early Juvenile	Late Juvenile	Marine Immaturing and Maturing Adults*	Adult
GOA Pacific Ocean Perch	x	n/a	x	n/a	n/a	x	2	n/a	2
BSAI Pacific Cod	x	n/a	x	n/a	n/a	x	2	n/a	2
BSAI Golden King Crab	2	n/a	x	n/a	n/a	x	2	n/a	2
Weathervane Scallop	x	n/a	x	n/a	n/a	x	2	n/a	2
Chinook Salmon	3	1	n/a	1	1	n/a	n/a	1	3

x - no information available
n/a - not applicable
* - terminology used only for salmon life history stage information

2.3.1.4.1 GOA Groundfish FMP

The following is an example of how Alternative 4 would describe EFH for species included in the FMU of the GOA Groundfish FMP. In this case, the example is an EFH description for all life stages of GOA Pacific ocean perch under Alternative 4.

Eggs—No EFH Description Determined
Insufficient information is available.

Larvae—No EFH Description Determined
Insufficient information is available.

Early Juveniles—No EFH Description Determined
Insufficient information is available.

Late Juveniles
EFH for late juvenile Pacific ocean perch is the known concentration area for this life stage, located in the middle to lower portion of the water column along the inner shelf (0 to 50 m), middle shelf (50 to 100 m), outer shelf (100 to 200 m), and upper slope (200 to 500 m) throughout the GOA wherever there are substrates consisting of cobble, gravel, mud, sandy mud, or muddy sand, as depicted by Figure 2-16.

Adults
EFH for adult Pacific ocean perch is the known concentration area for this life stage, located in the lower portion of the water column along the outer shelf (100 to 200 m) and upper slope (200 to 500 m) throughout the GOA wherever there are substrates consisting of cobble, gravel, mud, sandy mud, or muddy sand, as depicted by Figure 2-16.

2.3.1.4.2 BSAI Groundfish FMP

The following is an example of how Alternative 4 would describe EFH for species included in the FMU of the BSAI Groundfish FMP. In this case, the example is an EFH description for all life stages of BSAI Pacific cod under Alternative 4.

Eggs—No EFH Description Determined
Insufficient information is available.

Larvae—No EFH Description Determined
Insufficient information is available.

Early Juveniles—No EFH Description Determined
Insufficient information is available.

Late Juveniles
EFH for late juvenile Pacific cod is the known concentration area for this life stage, located in the lower portion of the water column along the inner (0 to 50 m), middle (50 to 100 m), and outer (100 to 200 m) shelf throughout the BSAI wherever there are soft substrates consisting of sand, mud, sandy mud, and muddy sand, as depicted in Figure 2-17.

Adults
EFH for adult Pacific cod is the known concentration area for this life stage, located in the lower portion of the water column along the inner (0 to 50 m), middle (50 to 100 m), and outer (100 to 200 m) shelf throughout the BSAI wherever there are soft substrates consisting of sand, mud, sandy mud, muddy sand, and gravel, as depicted in Figure 2-17.

2.3.1.4.3 BSAI King and Tanner Crab FMP

The following is an example of how Alternative 4 would describe EFH for species included in the FMU of the BSAI King and Tanner Crab FMP. In this case, the example is an EFH description for all life stages of BSAI Golden King Crab under Alternative 3.

Eggs
EFH of Golden king crab eggs is inferred from the known concentration of egg-bearing female crab (see also Adults).

Larvae—No EFH Description Determined
Insufficient information is available.

Early Juveniles—No EFH Description Determined
Insufficient information is available.

Late Juveniles
EFH for late juvenile Golden king crab is the known concentration area for this life stage, located in bottom habitats along the upper slope (200 to 500 m), intermediate slope (500 to 1,000 m), lower slope (1,000 to 3,000 m), and basins (more than 3,000 m) of the BSAI where there are high-relief living habitats such as coral and vertical substrates such as boulders, vertical walls, ledges, and deep water pinnacles, as depicted in Figure 2-18.

Adults
EFH for adult Golden king crab is the known concentration area for this life stage, located in bottom habitats along the outer shelf (100 to 200 m), upper slope (200 to 500 m), intermediate slope (500 to 1,000 m), lower slope (1,000 to 3,000 m), and basins (more than 3,000 m) of the BSAI where there are high-relief living habitats such as coral and vertical substrates such as boulders, vertical walls, ledges, and deep water pinnacles, as depicted in Figure 2-18.

2.3.1.4.4 Alaska Scallop FMP

The following is an example of how Alternative 4 would describe EFH for species included in the FMU of the Alaska Scallop FMP. In this case, the example is an EFH description for all life stages of weathervane scallops under Alternative 4.

Eggs—No EFH Description Determined
Insufficient information is available.

Larvae—No EFH Description Determined
Insufficient information is available.

Early Juveniles—No EFH Description Determined
Insufficient information is available.

Late Juveniles
EFH for late juvenile weathervane scallops is the known concentration area for this life stage, located in the sea floor along the middle (50 to 100 m) and outer (100 to 200 m) shelf in concentrated areas of the GOA and BSAI where there are substrates of clay, mud, sand, and gravel that are generally elongated in the direction of current flow, as depicted in Figure 2-19.

Adults
EFH for adult weathervane scallops is the known concentration area for this life stage, located in the sea floor along the middle (50 to 100 m) and outer (100 to 200 m) shelf in concentrated areas of the GOA and BSAI where there are substrates of clay, mud, sand, and gravel that are generally elongated in the direction of current flow, as depicted in Figure 2-19.

2.3.1.4.5 Alaska Salmon FMP

The following is an example of how Alternative 4 would describe EFH for species included in the FMU of the Salmon FMP. In this case, the example EFH description is for all life stages of Chinook salmon under Alternative 4. NOTE: Select figures (maps) concentrate on freshwater areas of the Southeast Alaska Region to provide detail for this review. EFH descriptive maps will be completed for all other regions of Alaska.

Freshwater Eggs
EFH for Chinook salmon eggs is the known concentration of adult spawning areas, consisting of gravel substrates in freshwaters identified by the state of Alaska's *Catalog of Waters Important for the Spawning, Rearing, or Migration of Anadromous Fishes* (ADF&G 1998a), as depicted in Figure 2-20.

Freshwater Larvae and Juveniles

EFH for larval and juvenile Chinook salmon is the general distribution area for this life stage, located in those waters identified by the state of Alaska's *Catalog of Waters Important for the Spawning, Rearing, or Migration of Anadromous Fishes* (ADF&G 1998a) and contiguous rearing areas within the boundaries of ordinary high water. Juvenile Chinook salmon out-migrate from freshwater areas in April toward the sea and may spend up to a year in major tributaries or rivers, such as the Kenai, Yukon, Taku, and Copper Rivers, as depicted in Figure 2-21.

Estuarine Juveniles
Estuarine EFH for juvenile Chinook salmon is the general distribution area for this life stage, located in estuarine areas, as identified by the salinity transition zone (ecotone) and the mean higher tide line, within nearshore waters. Chinook salmon smolts and post-smolt juveniles may be present in these estuarine habitats from April through September, as depicted in Figure 2-22.

Marine Juveniles
Marine EFH for juvenile Chinook salmon is the general distribution area for this life stage, located in all marine waters off the coast of Alaska from the mean higher tide line to the 200-nm limit of the U.S. EEZ, including the GOA, EBS, Chukchi Sea, and Arctic Ocean. Juvenile marine Chinook salmon are at this life stage from April until annulus formation in January or February during their first winter at sea, as depicted in Figure 2-22.

Marine Immature and Maturing Adults
EFH for immature and maturing adult Chinook salmon is the general distribution area for this life stage, located in marine waters off the coast of Alaska and ranging from the mean higher tide line to the 200-nm limit of the U.S. EEZ, including the GOA, EBS, Chukchi Sea, and Arctic Ocean, as depicted in Figure 2-22.

Freshwater Adults
EFH for adult Chinook salmon is the known concentration of adult spawning areas, located in fresh waters identified by the state of Alaska's *Catalog of Waters Important for the Spawning, Rearing, or Migration of Anadromous Fishes* (ADF&G 1998a) wherever there are spawning substrates consisting of gravels from April through September, as depicted in Figure 2-20.

2.3.1.5 Alternative 5: Eco-region Strategy

Under this alternative, EFH is described for all life history stages for all species listed within these eight ecoregions (freshwater, nearshore and estuarine, inner and middle shelf, outer shelf, upper slope, middle slope, lower slope, and basin) by characterizing the species that use each ecoregion and the habitat types present. The ecoregion description of EFH consists of the following:

- A description of species association within the ecoregion, which may lead to finer habitat definitions
- A description of the range of physical bottom habitat characteristics from available information, if any
- An index that links species by habitat type (to satisfy the requirement in the final rule for a species by species EFH description)

Objective
The objective of this alternative is to describe EFH using an ecosystem approach relating the physical, oceanographic, and biological environments to describe EFH as areas containing many species and their associated habitats. EFH descriptions include general distributions, depth, substrate, water circulation patterns, temperature, predator-prey relationships, and other characteristics of the BSAI and GOA for any life stage of the species, if known.

Rationale

This alternative will describe EFH as broad areas for all life stages of the species (discrete areas will not be described as EFH), thereby incorporating uncertainty relative to habitat use by individual FMP species.

Methodology

The North Pacific Ocean, EBS, Chukchi Sea, and Beaufort Sea are broken into three subregions: the GOA, EBS, and AI. Each subregion is analyzed using best scientific information and other sources of information such as the Ecosystem SAFE Reports for each FMP. EFH is then described listing those characteristics of the subarea.

The following pages contain EFH text descriptions for the EBS, AI, and GOA ecoregions.

Freshwater Ecosystem

EFH for the freshwater ecosystem is those waters and substrate necessary for anadromous fish, specifically salmon. Freshwater areas described for salmonids are as identified by the State of Alaska's *Catalog of Waters Important for the Spawning, Rearing, or Migration of Anadromous Fishes* (ADF&G 1998a). There are more than 15,000 anadromous waters catalogued in this atlas.

Freshwater EFH provides habitat for spawning and rearing of anadromous fish species, including salmon and smelt.

EFH Habitat Domain	
Ecosystem:	Freshwater
Ecoregion:	BSAI; GOA
Habitat Type:	Riverine
Habitat Modifiers	
Depth Range:	N/A
Substrate:	Gravel; sand; mud; cobble
Structure:	Flow; organic debris

Freshwater EFH Species and Life History Stage	
Chinook salmon	Eggs, juveniles, adults
Coho salmon	Eggs, juveniles, adults
Pink salmon	Eggs, juveniles, adults
Sockeye salmon	Eggs, juveniles, adults
Chum salmon	Eggs, juveniles, adults
Euchalon	

Nearshore and Estuarine Ecosystem

EFH in nearshore and estuarine ecosystem is those waters and substrate from the surface, to, and including the sea floor. EFH species for this domain are listed below. A map showing the location of EFH for the estuarine ecosystem is provided as Figure 2-23. Estuarine areas are those areas measured by water quality parameters such as salinity and meeting the following general criteria:

- A partly enclosed tidal inlet of the sea in which seawater and river water mix to some degree
- Any embayment or partially enclosed body of water that opens to the ocean somewhere and (normally) also has some freshwater inflow
- A semi-enclosed coastal body of water that has a free connection with the open sea and within which seawater is measurably diluted with fresh water

Estuarine EFH provides habitat for juvenile life history stages and adult EFH species, such as rearing areas, migratory corridors, maturing areas, and spawning habitats.

EFH Habitat Domain	
Ecosystem:	Nearshore and estuarine
Ecoregion:	BSAI; GOA
Habitat Type:	Intertidal
Habitat Modifiers	
Depth Range:	High tide to 3 m
Substrate:	Rock, sand, gravel, mud, organic debris
Structure:	Living structure: eelgrass, kelp, rockweed Non-living biostructure: shell hash

Roundfish	Flatfish	Rockfish	Crab	Scallop	Other
Pacific cod [1/]	Yellowfin sole [1/]	Thornyhead [1/, 3/]	Blue king crab [1/, 3/]	N/A	Sculpins
*Atka mackerel	Rock sole [1/]	Yelloweye [1/, 3/]	Red king crab [1/, 3/]		*Squid
*Walleye pollock	Arrowtooth flounder [1/]	Dusky [1/, 3/]	Snow crab		Octopus
Sablefish		Copper [1/, 3/]			*Forage fish
*Chinook salmon [1/, 2/]		Northern [1/, 3/]			
*Coho salmon [1/, 2/]					
*Pink salmon [1/, 2/]					
*Sockeye salmon [1/, 2/]					
*Chum salmon [1/, 2/]					

[1/] Juvenile area
[2/] Adult and juvenile seasonal migratory or spawning areas
[3/] Adult nearshore area
* Species is pelagic or semi-demersal.
N/A = not applicable

Inner and Middle Shelf Ecosystem

EFH for the inner and middle continental shelf is those waters and substrate within this depth range from the surface, to, and including the benthos. Maps showing the location of EFH for the inner and middle shelf ecosystem are provided as Figures 2-24 and 2-25. EFH species are listed below for this domain.

EFH Habitat Domain	
Ecosystem:	Marine
Ecoregion:	BSAI; GOA
Habitat Type:	Shallows; banks
Habitat Modifiers	
Depth Range:	0 to 100 m
Substrate:	Gravel, mud, sand, pebble, rock, organic debris
Structure:	Living structure: eelgrass, kelps, soft corals, anemones, sea pens
	Non-living bio-structure: shell hash

Roundfish	**Flatfish**	**Rockfish**	**Crab**	**Scallop**	**Other**
Pacific cod	Arrowtooth flounder	Thornyhead	Blue king crab	Weathervane	Sculpins
*Atka mackerel	Flathead sole	Yelloweye	Red king crab		*Squid
*Walleye pollock	Yellowfin sole		Snow crab		*Sharks
	Rock sole				Octopus
*Chinook salmon	Rex sole				*Forage fish
*Coho salmon	Alaska plaice				
*Pink salmon	Dover sole				
*Sockeye salmon					
*Chum salmon					

*Species is pelagic or semi-demersal.

Outer Shelf Ecosystem

EFH for the outer continental shelf is those waters and substrate, within this depth range, from the surface, to, and including the sea floor. Maps showing the location of EFH for the inner and middle shelf ecosystem are provided as Figures 2-26 and 2-27. EFH species are listed below for this domain.

EFH Habitat Domain	
Ecosystem:	Marine
Ecoregion:	BSAI; GOA
Habitat Type:	Shallows; gullies; flats
Habitat Modifiers	
Depth Range:	0 to 200 m
Substrate:	Gravel, mud, sand, pebble, rock
Structure:	Living structure: soft corals, hard corals, anemones, sea pens Non-living bio-structure: shell hash

Roundfish	**Flatfish**	**Rockfish**	**Crab**	**Scallop**	**Other**
Pacific cod	Arrowtooth flounder	Dusky	Blue king crab	Weathervane	Sculpins
*Atka mackerel	Flathead sole	Pacific ocean perch	Red king crab		*Squid
*Walleye pollock	Yellowfin sole	Thornyhead	Snow crab		*Sharks
	Rock sole	Yelloweye	Golden king crab		Octopus
*Chinook salmon	Rex sole	Northern	Grooved Tanner crab		Forage fish
*Coho salmon		Shortraker	Scarlet king crab		
*Pink salmon	Dover sole	Rougheye	Triangle Tanner crab		
*Sockeye salmon	Greenland turbot				
*Chum salmon					

*Species is pelagic or semi-demersal.

Upper Slope Ecosystem

EFH is the upper slope is those waters and substrate, within this depth range, from the surface, to, and including the benthos. Maps showing the location of EFH for the upper slope ecosystem are provided as Figures 2-28 and 2-29. EFH species are listed below for this domain.

EFH Habitat Domain	
Ecosystem:	Marine
Ecoregion:	BSAI; GOA
Habitat Type:	Gullies, flats, edge, deep gullies, slopes
Habitat Modifiers	
Depth Range:	0 to 500 m
Substrate:	Gravel, mud, sand, pebble, rock
Structure:	Living structure: soft corals, hard corals, anemones, sea pens Non-living bio-structure: shell hash

Roundfish	**Flatfish**	**Rockfish**	**Crab**	**Scallop**	**Other**
Sablefish	Arrowtooth flounder	Thornyhead	Red king crab	N/A	Sculpins
*Salmonids Chinook Coho Pink Sockeye Chum	Rex sole	Yelloweye	Snow crab		Skates
*Walleye pollock	Greenland turbot	Dusky	Golden king crab		*Sharks
	Dover sole	Northern	Grooved Tanner crab		Octopus
		Pacific ocean perch	Scarlett king crab		*Forage fish
			Triangle Tanner crab		
		Shortraker Rougheye			

*Species is pelagic or semi-demersal.
N/A = not applicable

Middle Slope Ecosystem

EFH for the middle slope is those waters and substrate, within this depth range, from the surface, to, and including the sea floor. Maps showing the locations of EFH for the intermediate slope ecosystem are provided as Figures 2-30 and 2-31. EFH species are listed below for this domain.

EFH Habitat Domain	
Ecosystem:	Marine
Ecoregion:	BSAI; GOA
Habitat Type:	Slopes
Habitat Modifiers	
Depth Range:	0 to 1,000 m
Substrate:	Gravel, mud, sand, pebble, rock
Structure:	Living structure: deep water corals, sea pens Non-living bio-structure: shell hash

Roundfish	**Flatfish**	**Rockfish**	**Crab**	**Scallop**	**Other**
Sablefish	Arrowtooth flounder	Thornyhead	Snow crab	N/A	Sculpins
*Walleye pollock	Rex sole	Yelloweye	Golden king crab		Skates
*Chinook salmon	Greenland turbot	Dusky	Grooved Tanner crab		*Sharks
*Coho salmon		Northern	Scarlett king crab		Octopus
*Pink salmon		Pacific ocean perch	Triangle Tanner crab		*Forage fish
* Sockeye salmon		Shortraker			*Squid
*Chum salmon		Rougheye			

*Species is pelagic or semi-demersal.
N/A = not applicable

Lower Slope Ecosystem

EFH in the lower slope is those waters and substrate, within this depth range, from the surface, to, and including the sea floor. Maps showing the locations of EFH for the lower slope ecosystem are provided as Figures 2-32 and 2-33. EFH species are listed below for this domain.

EFH Habitat Domain	
Ecosystem:	Marine
Ecoregion:	BSAI; GOA
Habitat Type:	Slopes
Habitat Modifiers	
Depth Range:	0 to 3,000 m
Substrate:	Gravel, mud, sand, boulder, bedrock
Structure:	Living structure: deep water corals, Non-living bio-structure: shell hash, carcasses

Roundfish	**Flatfish**	**Rockfish**	**Crab**	**Scallop**	**Other**
Sablefish	Greenland turbot	Thornyhead	Snow crab	N/A	*Squid
*Salmonids Chinook Coho Pink Sockeye Chum			Golden king crab		
*Walleye pollock			Grooved Tanner crab Scarlett king crab Triangle Tanner crab		

*Species is pelagic or semi-demersal.
N/A = not applicable

Basin Ecosystem

EFH in the basin is those waters and substrate, within this depth range, from the surface, to, and including the sea floor. Maps showing the locations of EFH for the basin ecosystem are provided as Figures 2-34 and 2-35. EFH species are listed below for this domain.

EFH Habitat Domain	
Ecosystem:	Marine
Ecoregion:	BSAI; GOA
Habitat Type:	Basin
Habitat Modifiers	
Depth Range:	0 to more than 3,000 m
Substrate:	Mud, boulder, bedrock
Structure:	Living structure
	Non-living bio-structure

Roundfish	Flatfish	Rockfish	Crab	Scallop	Other
*Walleye pollock	N/A	N/A	Snow crab Golden king crab Grooved Tanner crab Scarlett king crab Triangle Tanner crab	N/A	*Squid

*Species is pelagic or semi-demersal.
N/A = not applicable

2.3.1.6 Alternative 6: EEZ Only

Under this alternative, EFH would be identified and described using the updated general distribution description criteria (i.e., Alternative 3 language), but would be identified and described only within the EEZ. In other words, the FMPs would be amended to remove any reference to EFH descriptions that include freshwater areas and other areas regulated by the state of Alaska (generally described as those waters between the 0- to 3-nm range from shore, plus waters of Upper Cook Inlet, Prince William Sound, and portions of Southeast Alaska).

Objective
The objective of this alternative is to describe EFH for each particular life stage using analytical tools and updated scientific information for only those waters and substrates in the EEZ where the species is known to associate or recruit in scientific survey and commercial fishery catches. EFH is described as 95 percent of the EEZ where the species life stage has been recruited to the survey, investigated through research, officially observed, or reported in a vessel catch log.

Methodology
Alternative 6 analysis is similar to Alternative 3 except that the area described as EFH is limited to only those waters of the EEZ (3 to 200 nm). As in Alternative 3, Alternative 6 also focused on two significant fishery geographic information data resources, survey (RACE) and catch (NORPAC). Each data set was analyzed for 95 percent of the total accumulated population for the species using GIS. An EFH shape file was developed as the intersection of these data sets.

For BSAI Groundfish, GOA Groundfish, BSAI Crab, and Scallop FMP species, fishery CPUE data from the NMFS Observer database (NORPAC, 1990 to 2001) and NMFS trawl survey data from RACE, 1987 to 2002, and, where appropriate, ADF&G survey data were analyzed to estimate the population distribution of each species. Where this information exists, the area described by this data is EFH. The analyzed EFH data and area are further reviewed by scientific stock assessment authors for accuracy. This review ensures that any outlying areas not considered were included, and any errors in the data or described EFH area were removed.

For Salmon FMP species, the analysis is broken into three parts: marine, nearshore, and freshwater. Under Alternative 6, only the marine portion of their life stage would be described as EFH. The nearshore areas used by juveniles and freshwater areas used by egg, larvae, and returning adult salmon would not be included as they are not within the EEZ. Marine areas are generally described as those marine waters from the mean higher high tide line seaward to the limits of the EEZ.

Rationale
Similar to Alternatives 2 and 3, Alternative 6 incorporates the basic rationales to describe EFH as general distribution.

2.3.1.6.1 GOA Groundfish FMP

The following is an example of how Alternative 6 would describe EFH for species included in the FMU of the GOA Groundfish FMP. In this case, the example EFH description is for all life stages of GOA Pacific ocean perch under Alternative 6.

Eggs—No EFH Description Determined
Insufficient information is available.

Larvae—No EFH Description Determined
Insufficient information is available.

Early Juveniles—No EFH Description Determined
Insufficient information is available.

Late Juveniles
EFH for late juvenile Pacific ocean perch is the general distribution area for this life stage, located in the middle to lower portion of the water column along the inner shelf (0 to 50 m), middle shelf (50 to 100 m), outer shelf (100 to 200 m), and upper slope (200 to 500 m) limited to the EEZ of the GOA wherever there are substrates consisting of cobble, gravel, mud, sandy mud, or muddy sand, as depicted in Figure 2-36.

Adults
EFH for adult Pacific ocean perch is the general distribution area for this life stage, located in the lower portion of the water column along the outer shelf (100 to 200 m) and upper slope (200 to 500 m) limited to the EEZ of the GOA wherever there are substrates consisting of cobble, gravel, mud, sandy mud, or muddy sand, as depicted in Figure 2-36.

2.3.1.6.2 BSAI Groundfish FMP

The following is an example of how Alternative 6 would describe EFH for species included in the FMU of the BSAI Groundfish FMP. In this case, the example EFH description is for all life stages of BSAI Pacific cod under Alternative 6.

Eggs—No EFH Description Determined
Scientific information notes the rare occurrence of Pacific cod eggs..

Larvae—No EFH Description Determined
Scientific information notes the rare occurrence of Pacific cod larvae..

Early Juveniles—No EFH Description Determined
Insufficient information is available.

Late Juveniles
EFH for late juvenile Pacific cod is the general distribution area for this life stage, located in the lower portion of the water column along the inner (0 to 50 m), middle (50 to 100 m), and outer (100 to 200 m) shelf limited to the EEZ of the BSAI wherever there are soft substrates consisting of sand, mud, sandy mud, and muddy sand, as depicted in Figure 2-37.

Adults
EFH for adult Pacific cod is the general distribution area for this life stage, located in the lower portion of the water column along the inner (0 to 50 m), middle (50 to 100 m), and outer (100 to 200 m) shelf limited to the EEZ of the BSAI wherever there are soft substrates consisting of sand, mud, sandy mud, muddy sand, and gravel, as depicted in Figure 2-37.

2.3.1.6.3 BSAI King and Tanner Crab FMP

The following is an example of how Alternative 6 would describe EFH for species included in the FMU of the BSAI King and Tanner Crab FMP. In this case, the example EFH description is for all life stages of BSAI Golden King Crab under Alternative 6.

Eggs
EFH of Golden king crab eggs is inferred from the general distribution of egg-bearing female crab (see also Adults).

Larvae—No EFH Description Determined
Insufficient information is available.

Early Juveniles—No EFH Description Determined
Insufficient information is available.

Late Juveniles
EFH for late juvenile Golden king crab is the general distribution area for this life stage, located in bottom habitats along the upper slope (200 to 500 m), intermediate slope (500 to 1,000 m), lower slope (1,000 to 3,000 m), and basins (more 3,000 m) of the BSAI where there are high-relief living habitats such as coral and vertical substrates such as boulders, vertical walls, ledges, and deep water pinnacles, as depicted in Figure 2-38.

Adults
EFH for adult Golden king crab is the general distribution area for this life stage, located in bottom habitats along the outer shelf (100 to 200 m), upper slope (200 to 500 m), intermediate slope (500 to 1,000 m), lower slope (1,000 to 3,000 m), and basins (more than 3,000 m) of the BSAI where there are high-relief living habitats such as coral and vertical substrates such as boulders, vertical walls, ledges, and deep water pinnacles, as depicted in Figure 2-38.

2.3.1.6.4 Alaska Scallop FMP

The following is an example of how Alternative 6 would describe EFH for species included in the FMU of the Alaska Scallop FMP. In this case, the example EFH description is for all life stages of weathervane Scallops under Alternative 6.

Eggs—No EFH Description Determined
Insufficient information is available.

Larvae—No EFH Description Determined
Insufficient information is available.

Early Juveniles—No EFH Description Determined
Insufficient information is available.

Late Juveniles
EFH for late juvenile weathervane scallops is the general distribution area for this life stage, located in the sea floor along the middle (50 to 100 m) and outer (100 to 200 m) shelf in concentrated areas of the GOA and BSAI and limited to the EEZ where there are substrates of clay, mud, sand, and gravel that are generally elongated in the direction of current flow, as depicted in Figure 2-39.

Adults
EFH for adult weathervane scallops is the general distribution area for this life stage, located in the sea floor along the middle (50 to 100 m) and outer (100 to 200 m) shelf in concentrated areas of the GOA and BSAI and limited to the EEZ where there are substrates of clay, mud, sand, and gravel that are generally elongated in the direction of current flow, as depicted in Figure 2-39.

2.3.1.6.5 Alaska Salmon FMP

The following is an example of how Alternative 6 would describe EFH for species included in the FMU of the Salmon FMP. In this case, the example EFH description is for all life stages of Chinook salmon under Alternative 6.

Freshwater Eggs—No EFH Description Determined
All are outside of the EEZ area.

Freshwater Larvae and Juveniles—No EFH Description Determined
All are outside of the EEZ area.

Estuarine Juveniles—No EFH Description Determined
All are outside of the EEZ area.

Marine Juveniles
Marine EFH for juvenile Chinook salmon is the general distribution area for this life stage, located in all marine waters off the coast of Alaska (more than 3 nm) extending to the 200-nm limit of the U.S. EEZ, including the GOA, EBS, Chukchi Sea, and Arctic Ocean. Juvenile marine Chinook salmon are at this life stage from April until annulus formation in January or February during their first winter at sea, as depicted in Figure 2-40.

Marine Immature and Maturing Adults
EFH for immature and maturing adult Chinook salmon is the general distribution area for this life stage, located in marine waters off the coast of Alaska (more than 3 nm) extending to the 200-nm limit of the U.S. EEZ, including the GOA, EBS, Chukchi Sea, and Arctic Ocean, as depicted in Figure 2-40.

Freshwater Adults—No EFH Description Determined
All are outside of the EEZ area.

2.3.2 HAPC Identification Alternatives

Identification of HAPCs is not required by statute or regulatory guidelines. The regulations state the following:

> FMPs should identify specific types or areas of habitat within EFH as habitat areas of particular concern based on one or more of the following considerations:
>
> (I) The importance of the ecological function provided by the habitat.
> (ii) The extent to which the habitat is sensitive to human-induced environmental degradation.
> (iii) Whether, and to what extent, development activities are, or will be, stressing the habitat type.
> (iv) The rarity of the habitat type.

Based on previous experience with HAPC proposals and analysis, the Council determined that identification of HAPCs is a two-step process. The first step is to define the methodology for identification of HAPCs. The second step is to identify specific types, sites, or areas to describe as HAPCs, which would be done in a subsequent process. The alternatives evaluated in this analysis will complete the first step in that they will define the direction the Council will take to identify specific HAPC types, sites, or areas in the future. After a decision is made on the methodology for identification of HAPCs, based on this analysis, the Council will use a public stakeholder process to identify specific types, sites, or areas as HAPCs. The Council is proceeding with the first iteration of that process concurrently with this EIS and analyzing specific proposed HAPCs in a separate EA.

The following sections provide a description of alternatives evaluated in this analysis for the methodology for identification of HAPCs. To understand the differences among the alternatives, examples of how these alternatives may translate into specific HAPC areas are also provided. In June 2002, the Council suggested that the analysis use the following as examples of HAPCs: corals, pinnacles and seamounts, Bristol Bay red king crab, and the continental shelf break (slope area). These areas/species were chosen as examples for the following reasons: 1) they had been proposed for HAPC identification by the public in an earlier process, and 2) they include a broad range of possible HAPC identifications. A side-by-side comparison of the HAPC identification alternatives is provided in Table 2-6.

2.3.2.1 Alternative 1: No HAPC Identification

Under this alternative, FMPs would be amended to remove any description and identification of HAPCs.

2.3.2.2 Alternative 2: Status Quo (No Action)

Under this alternative, HAPCs would remain as defined and adopted under Amendments 55/55/8/5/5: living substrates in shallow waters, living substrates in deep waters, and freshwater areas used by anadromous fish.

Using the methodology of Alternative 2, discussion of HAPC identification for the examples (corals, pinnacles and seamounts, Bristol Bay red king crab, and slope) is provided below.

Corals – Corals would be considered HAPCs in that they are living substrates in shallow and deep waters.

Pinnacles and seamounts – These would not be considered HAPCs under this alternative.

Bristol Bay red king crab – Areas used by red king crab would not specifically be considered HAPCs under this alternative. Note, however, that juvenile red king crab are thought to use living substrate in shallow water (e.g., stalked ascidians) for shelter.

Slope area – The slope area would not be considered a HAPC under this alternative.

2.3.2.3 Alternative 3 (Preliminary Preferred Alternative): Site-based Concept

Under this alternative, FMPs would be amended to allow for identification of HAPC sites. Individual sites meeting one or more of the HAPC considerations and selected to address an identified problem may be described sites. This alternative does not allow for identification of HAPCs as types of habitat, but limits HAPCs to explicit geographically defined sites or locations.

Using the methodology of Alternative 3, discussion of HAPC identification for the examples (corals, pinnacles and seamounts, Bristol Bay red king crab, and slope) is provided below.

Corals – Sites with corals may be considered HAPCs if described as such. Coral sites likely meet the HAPC considerations set forth in the final rule in that these sites may be sensitive to human-induced environmental degradation. As recent research shows, corals as a group would not be considered to be a rare habitat type in the AI area.

Pinnacles and seamounts – Specific pinnacles and seamounts could, in some cases, be considered HAPCs under this alternative, if described as such. Pinnacles could have some important ecological function. Some pinnacles could be stressed by intense fishing in the future. In some areas, pinnacles might be rare, whereas in other locales, they might be common. Seamounts could be considered rare habitat types, as there are only eight named seamounts within the EEZ. The importance of the ecological function provided by the habitat remains unknown.

Bristol Bay red king crab – Some portion of the area used by red king crab could be considered a HAPC under this alternative. Young of the year and juvenile red king crab are thought to require living substrates such as ascidians for shelter. Areas within Bristol Bay that contain this habitat type are currently closed to all trawling.

Slope area – Some portions of the slope area could possibly be considered a HAPC under this alternative. Some of the slope area likely has important ecological functions for the BSAI and GOA; however, the slope habitat is not likely to be sensitive to human-induced environmental degradation and is not a rare habitat type.

2.3.2.4 Alternative 4: Type/Site Based Concept

Under this alternative, FMPs would be amended to allow for identification of individual HAPC sites selected as subsets of habitat types. This would establish a two-step process as follows:

Step A: Types would be selected based on the HAPC considerations set forth in the Final Rule (67 FR 2343).

Step B: HAPC sites would be identified as all known sites of the habitat type, or a subset of the habitat type, again meeting the considerations set forth in the Final Rule.

Using the methodology of Alternative 4, discussion of HAPC identification for the examples (corals, pinnacles and seamounts, Bristol Bay red king crab, and slope) is provided below.

Corals – Corals could be considered a HAPC type because they are likely to be sensitive to human-induced degradation. Sites with corals may be described as HAPCs for the same reason.

Pinnacles and seamounts – As a category, pinnacles may be considered as a HAPC type. Pinnacles could have some important ecological function. Some, but not all, pinnacles could be

stressed by intense fishing in the future. In some areas, pinnacles might be rare, whereas in other locales, they might be common. Specific pinnacle sites could be described. As a category, seamounts would be considered as a HAPC type. Seamounts could be considered as a rare habitat type. Only those seamounts within the EEZ could be described as HAPCs; however, the importance of the ecological function provided by Alaska seamounts remains unknown.

Bristol Bay red king crab – As a category, areas used by the Bristol Bay red king crab stocks would not likely be considered as a HAPC type. All areas used by a species (in this example, red king crab) would not likely meet the considerations set forth in the rule. As such, no specific sites could be described.

Slope area – As a category, the slope area would not likely be considered a HAPC type, because it is unlikely that all areas of the slope meet the considerations set forth in the rule, such as rarity or developmental vulnerability (the slope is an expansive area of the Alaska Region and is not considered rare or subject to large-scale developmental activities, as a whole). As such, no specific sites could be described.

2.3.2.5 Alternative 5: Species Core Area

Under this alternative, FMPs would be amended to allow for identification of HAPC areas for individual species. These HAPC areas would be defined for FMP species based on the productivity of the habitat.

Using the methodology of Alternative 5, discussion of HAPC identification for the examples (corals, pinnacles and seamounts, Bristol Bay red king crab, and slope) is provided below.

Corals – Sufficient information does not exist to indicate that any managed species in Alaska uses corals as a core habitat. Therefore, corals would not be described as HAPCs under this alternative.

Pinnacles and seamounts – Pinnacles and seamounts would not be specifically described as HAPCs under this alternative. They are not considered to be core areas for any FMP species. Seamounts may not contain EFH (under most, if not all, alternatives considered) for any FMP species (except for the water column at the surface, which could be described EFH for salmon).

Bristol Bay red king crab – The core area for Bristol Bay red king crab could be considered to include the areas of highest density for adults and juveniles. The assumption would be that the high-density areas are the core areas containing the most productive habitat for this species. Survey and fishery data could be examined to identify these areas. There are no comprehensive surveys of young-of-the-year red king crab.

Slope area – The entire slope would not be specifically described as a HAPC under this alternative. Nevertheless, the slope area contains EFH (under any alternative considered) for a number of FMP species, including what could be considered core areas for some (e.g., Pacific ocean perch).

2.3.3 Alternatives to Minimize the Effects of Fishing on EFH

The regulations (50 CFR 600) specify the following requirements for minimizing the effects of fishing on EFH.

> Each FMP must minimize to the extent practicable adverse effects from fishing on EFH, including EFH designated under other Federal FMPs. Councils must act to prevent,

> mitigate, or minimize any adverse effects from fishing, to the extent practicable, if there is evidence that a fishing activity adversely affects EFH in a manner that is more than minimal and not temporary in nature, based on the evaluation conducted pursuant to paragraph (a)(2)(I) of this section and/or the cumulative impacts analysis conducted pursuant to paragraph (a)(5) of this section. In such cases, FMPs should identify a range of potential new actions that could be taken to address adverse effects on EFH, include an analysis of the practicability of potential new actions, and adopt any new measures that are necessary and practicable. Amendments to the FMP or to its implementing regulations must ensure that the FMP continues to minimize to the extent practicable adverse effects on EFH caused by fishing. FMPs must explain the reasons for the Council's conclusions regarding the past and/or new actions that minimize to the extent practicable the adverse effects of fishing on EFH.

The overall strategy to address the effects of fishing on EFH was to start with an evaluation of the potential adverse effects, as required by the EFH final rule (50 CFR 600.815(a)(2)(i)). Because virtually all benthic areas of the EEZ in depths that can feasibly be reached by fishing gear would be considered EFH for some species (at various life stages) under all the EFH description alternatives considered, benthic habitat and EFH were considered to be the same for this evaluation. The evaluation had two parts. The first part was a spreadsheet analysis on the effects of all FMP fisheries (Witherell 2002, unpublished manuscript). The second part was a detailed evaluation of those groundfish fisheries that appeared to have potential for more than negligible effects on habitat (Rose 2002, unpublished manuscript). The final draft of the evaluation is included as Appendix B in this EIS.

The spreadsheet analysis, which incorporated the information on gear descriptions and habitat types fished, indicated that groundfish fisheries (trawl fisheries, in particular) had some measurable effect on benthic habitat, whereas the scallop, crab, and salmon fisheries (especially) had almost no measurable impacts, primarily due to the small footprints of these fisheries relative to available habitats (Witherell 2002, unpublished manuscript). For the scallop fishery, the analysis indicated that, although the effects of this gear on the bottom are higher than other gear types, the fishery occurs in areas and habitat types that have relatively rapid recovery rates. Additionally, the overall footprint (area affected annually) of the scallop fishery was very small (149 nm^2), equating to about 0.1 percent of the total available benthic habitat area. Thus, the effects of the fishery are concentrated in a relatively small proportion of EFH, and these effects are considered minimal in nature. For the BSAI crab fisheries, the analysis indicated that the fisheries have an extremely small overall footprint with the number of pot sets (approximately 720,000 pot sets per year) totaling about 1 nm^2 per year and equating to less than 0.0007 percent of the total available benthic EFH area. Thus, the effects of the fishery are concentrated in an extremely small proportion of available EFH, and these effects are considered minimal and temporary in nature. For the salmon fisheries, the analysis indicated that the effects of this gear on EFH are almost nonexistent, because the gear generally never touches bottom. Only the drift gill net fishery was found to have an overall footprint of more than 0.1 percent of available EFH. Because the gear never touches the bottom, however, this fishery does not affect EFH. Thus, the effects of the Alaska salmon fisheries on EFH are considered minimal and temporary in nature.

The preliminary evaluation of groundfish fisheries, which incorporated a spatial model of fishing intensity, together with habitat recovery rates, allowed for the relative ranking of fisheries based on their estimated effects on benthic habitat (Rose 2002, unpublished manuscript). Although the preliminary evaluation model could not quantitatively determine a level as to when fishing effects would be considered "more than minimal and not temporary in nature," the EFH Committee used the preliminary evaluation qualitatively to develop a range of actions to minimize adverse effects of fishing. In the absence of a preestablished

threshold, the EFH Committee and Council developed alternatives to cover the range of possible ways to minimize the effects of fishing on EFH to the extent practicable.

Alternatives were, for the most part, developed by the EFH Committee based on the preliminary fishery evaluation prepared by Rose (2002 unpublished). The results of the evaluation model indicated that the highest impacts were due to trawl fisheries, with biogenic shelter being the habitat component primarily affected. Further, the evaluation model showed that some trawl fisheries had higher impacts than other trawl fisheries. As such, the alternatives to the status quo were scaled such that the fisheries with the greatest effects on habitat were addressed in all alternatives, and the fisheries with fewer effects were only picked up and addressed in the higher numbered (and more restrictive) alternatives. For example, the fishery that scored highest on the evaluation (GOA slope rockfish fishery) is directly addressed in Alternatives 2 through 5, whereas fisheries with lower evaluation scores (e.g., the BSAI flatfish fishery) are addressed in Alternatives 4 and 5. There is also a trend for management measures to become more conservative as to EFH protection (as well as more restrictive to fishing operations) when moving from Alternatives 2 through 5.

The EFH Committee also recognized the limitations of the preliminary evaluation model and included additional measures designed to address concerns about habitat features not adequately evaluated. For example, the model is based on limited data regarding sediment distribution in the GOA and in the AI, so assumptions had to be made regarding the distribution of fishing effects across habitat types. Additionally, some EFH Committee members thought that the draft model did not adequately measure the effects of fishing on coral colonies, given potentially long recovery times. To address these concerns, the EFH Committee added additional management measures to minimize the adverse effects of fisheries. For example, Alternatives 4 and 5 include measures for AI fisheries, even though the preliminary evaluation model indicated that fisheries had almost no effect on benthic habitat features.

In addition to the preliminary evaluation model results, the EFH Committee used public testimony, scientific data reports, and other scientific information when developing alternatives to minimize the effects of fishing. The Committee reviewed past actions on EFH distribution (Council 1999) and HAPC locations (Council 2000), the scoping report, a NMFS discussion paper on possible management tools, a NMFS discussion paper on criteria for determining minimal and temporary impacts, analyses showing the distribution of various living substrates or benthic biota (coral, sponges, sea raspberries, etc.) (Witherell and Coon 2000, MacIntosh and Haaga 2000), maps of fishing effort distribution (Fritz et al. 1998), a report on description of fishing gear and fisheries, a spreadsheet model to estimate the effects of fisheries on habitat (Witherell 2002), a discussion paper on the effects of rationalization programs on EFH, reports on marine protected areas (Shipp 2002, Carr et al. 2002, Woodby et al. 2002), reports on the effects of trawls and other fishing gear on habitat (Johnson 2002, Northeast Region Essential Fish Habitat Steering Committee 2002, NRC 2002), and a strawman list of possible alternatives prepared by Council staff.

Alternative 5B (AI portion) and Alternative 6 were not based on the results of the preliminary evaluation model, but the Council included them (in December 2002) for analysis. The addition of these alternatives was supported by public testimony, as well as materials and other information discussed by the Council and the EFH Committee (see the previous paragraph). The concept for Alternative 5B was added to address heightened public concerns regarding potential trawling effects on corals and sponges in the AI area. After public review of the draft EIS, the Council added two new management options for the Aleutian Islands portion of Alternative 5B to examine different approaches for protecting undisturbed habitats, including corals, based on requests from a conservation group and a coalition of trawl fishermen. Alternative 6 is a completely different approach to habitat protection in that it does not differentiate among bottom fishing gears as to their effects on EFH.

Closure areas for each alternative were developed by the EFH Committee and Council. The size, number, and locations of these areas were chosen to reflect the relative degree of habitat conservation provided by each alternative (see the EFH Committee minutes for further discussion of rationale, available on the Council's website: www.fakr.noaa.gov/npfmc). In general, closure areas designated for Alternatives 2 through 5B had minimal or moderate amounts of fishing effort in recent years, and closure of these areas would offer recovery of affected benthic habitats. Because scientific research on trawling has shown that the first tow of a trawl in an area has the proportionately greatest impacts (see Chapter 3 and Appendix B for literature review), the assumption is that closure of the lower use areas offers a relatively high degree of conservation. Closures of areas with historically high trawl fishing effort were considered but were not included in the alternatives. Closure of these high use areas (with high groundfish catch rates) would result in the fleet having to exert a significantly greater effort in the remaining open areas to catch the quota, thereby resulting in substantially larger impacts on habitat—the exact opposite of what the alternatives were designed to accomplish. The closures for Alternative 6 were located to meet a variety of objectives such as an even dispersion of closures, closure areas proportional to available habitats and areas, overlap with existing Steller sea lion protection closures, and an attempt to limit economic impacts on commercial groundfish fisheries and communities.

The overall goal of all the alternatives is to minimize adverse effects of fishing on EFH to the extent practicable. To achieve that goal, alternatives to the status quo were developed with the following objectives in mind:

1. Prevent fishing effort from expanding into unfished or lightly fished areas.
2. Allow recovery of a portion of the habitat by restricting the highest impact fisheries.
3. Reduce fishing intensity and effort (the amount of fishing gear contact with the seafloor).
4. Reduce the effects of gear contact on the bottom (sensitivity differs by gear type).
5. Reduce the bycatch of corals, sponges, and other emergent epifauna.
6. Increase the availability of major prey species.
7. Establish control areas for scientific research and monitoring.
8. Limit restrictions on fisheries to what might be practicable.
9. Establish measures that can be adequately enforced.

In July 2002, the Ocean Studies Board of The National Academy of Science released its report "Effects of Trawling and Dredging on Seafloor Habitat" (NRC 2002). The report recommended that management of the effects of trawling and dredging should be tailored to the specific requirements of the habitat and the fishery through a balanced combination of the following management tools: 1) fishing effort reduction, 2) modifications of gear design or gear type, and 3) establishment of areas closed to fishing. The report noted the following:

> The optimal combination of these management approaches will depend on the characteristics of the ecosystem and the fishery—habitat type, resident seafloor species, frequency and distribution of fishing effort, gear type and usage, and the socioeconomics of the fishery. Each characteristic should be considered during the development of management plans for mitigating the impacts of fishing on the seafloor.

All of these characteristics were discussed at EFH Committee meetings and considered by the Council during the development of alternatives for this analysis.

For example, the National Academy of Science report also noted several very important characteristics of the Alaska bottom trawl fisheries, relative to fishing effort. Compared to the rest of the U.S., the continental shelf off Alaska is subjected to relatively low bottom trawl effort. Bottom trawling occurs on

less than half of the Alaska shelf. Of the areas fished, the intensity of bottom trawl fishing is relatively low and has been reduced over time. Total bottom trawling effort (measured in number of tows) declined significantly off Alaska during the 1990s, with a 30 percent reduction in effort in the EBS, a 50 percent reduction in the GOA, and a 33 percent reduction in the AI. Given this information, the EFH Committee and Council did not include effort reduction as a management tool in the alternatives to minimize the effects of fishing to the extent practicable. Because trawl fishing effort appears to have been controlled with existing effort limitation and rationalization programs (as described in Section 2.2.2), additional measures to directly reduce fishing effort (e.g., reduction in TAC or licenses, new rationalization programs) were thought to be neither reasonable nor practicable as tools to reduce effects of fishing on EFH. Further explanations regarding why these measures were not considered are provided in Section 2.5.3.

The following sections provide a description of alternatives evaluated in this analysis to minimize the effects of fishing on EFH. A comparison of the objectives and fishery management measures contained in the alternatives is provided in Table 2-7.

The final evaluation of fishing effects on habitat found no indication that current fishing activities have more than minimal and temporary impacts on EFH for managed species (see Appendix B). Nevertheless, the alternatives to minimize the effects of fishing (most of which were adopted for analysis by the Council prior to completion of the Appendix B evaluation) were included in this EIS to provide an opportunity for NMFS and the Council to consider potential changes to the FMPs to further minimize any effects of fishing on EFH.

2.3.3.1 Alternative 1 (Preliminary Preferred Alternative): Status Quo (No Action)

Under this alternative, no additional measures would be taken at this time to minimize the effects of fishing on EFH. No actions were taken to minimize the effects of fishing as part of the original EFH FMP Amendments 55/55/8/5/5; however, as discussed in Section 2.2.2, there are a number of existing measures that protect habitat from potential negative effects of fishing, and these measures would remain in effect. For reference, existing year-round trawl closure areas are shown in Figure 2-1.

Objectives: The stated goal of the status quo is to conserve, restore, and maintain habitats upon which commercial, recreational, and subsistence marine fisheries depend; to increase their extent; and to improve their productive capacity for the benefit of present and future generations. This goal is supported by three policy objectives: 1) maintain the current quantity and productive capacity of habitats (using a guiding principle of no net habitat loss caused by human activities), 2) restore and rehabilitate the productive capacity of habitats that have already been degraded by human activities, and 3) maintain productive natural habitats where increased fishery productivity will benefit society. As reviewed in Section 2.2.2, the Council attempts to achieve these objectives through measures that include fishing equipment restrictions, marine protected areas, harvest limits, effort limitation, fishery rationalization programs, and other fishery regulations to protect fish habitat.

2.3.3.2 Alternative 2: Gulf Slope Bottom Trawl Closures

This alternative would amend the GOA Groundfish FMP to prohibit the use of bottom trawls for rockfish in 11 designated and discrete areas of the GOA upper to intermediate slope (656 to 3,281 feet), but would allow vessels endorsed for trawl gear to fish for rockfish with fixed or pelagic trawl gear in these areas. These areas would be permanent, year-round closures. The closures established by this alternative would be in addition to existing habitat protection measures (e.g., area closures, gear restrictions, and limitations on fishing effort). Closure areas designated under this alternative are shown in Figure 2-41.

Objectives: The primary objective of this alternative is to restrict the higher impact trawl fisheries from a portion of the slope and to allow benthic habitat within these areas to recover (portions of the areas currently fished) or remain relatively undisturbed (portions of the areas currently subject to minimal fishing effort). The benthic habitat within these areas includes EFH for a number of GOA Groundfish FMP species, such as Pacific ocean perch, shortraker rockfish, rougheye rockfish, other slope rockfish, thornyhead rockfish, deepwater flatfish species, and sablefish. The secondary objective of this alternative is to provide incentive to fishers to reduce the effects of harvesting slope rockfish on EFH by allowing fishing with pelagic trawl or fixed gear in the closed areas. Such gear has lower impacts (reduction in habitat function due to effects of a single contact with the gear) than bottom trawl gear.

Rationale: The rationale for including this alternative for analysis is that it addresses the fishery with the highest score in the preliminary evaluation model. Although the evaluation model is unable to quantitatively determine the level at which fishing effects are considered to be "more than minimal and not temporary in nature," the rockfish fishery was determined to be more likely than other fisheries to exceed this level.

2.3.3.3 Alternative 3: Upper Slope Bottom Trawl Prohibition for GOA Slope Rockfish

This alternative would amend the GOA Groundfish FMP to prohibit the use of bottom trawl gear for targeting GOA slope rockfish species on the upper to intermediate slope area (656 to 3,281 feet), but would allow vessels endorsed for trawl gear to fish for slope rockfish with fixed or pelagic trawl gear. Of the depths between 200 and 300 m, only those areas that were relatively steep (with contours close together) and adjacent to the deeper slope were included in the upper slope, while all depths between 300 and 1,000 m were included in the closure area. Flat areas between 200 and 300 m that are on the shelf (Shelikof and the trough north of Portlock Bank) were not included in the definition of slope. These areas would be permanent, year-round closures. The closures established by this alternative would be in addition to existing habitat protection measures (e.g., area closures, gear restrictions, and limitations on fishing effort). Closure areas designated under this alternative are shown in Figure 2-42.

The slope rockfish assemblage currently includes four management groups: Pacific ocean perch, shortraker/rougheye rockfish, northern rockfish, and other slope rockfish (currently listed in the SAFE report to include aurora, blackgill, boccacio, chilipepper, darkblotch, greenstriped, harlequin, pygmy, redbanded, redstripe, sharpchin, shortbelly, silvergrey, splitnose, stripetail, vermilion, and yellowmouth rockfish).

Objectives: The primary objective of Alternative 3 is to eliminate the higher impact trawl fisheries from the entire slope area and to allow benthic habitat within these areas to recover (portions of the areas currently fished) or remain relatively undisturbed (portions of the areas currently subject to minimal fishing effort). The benthic habitat within these areas includes EFH for a number of GOA Groundfish FMP species, including Pacific ocean perch, shortraker rockfish, rougheye rockfish, other slope rockfish, thornyhead rockfish, deepwater flatfish species, and sablefish. The secondary objective of this alternative is to reduce the effects of harvesting slope rockfish on EFH by allowing transition to pelagic trawl or fixed gear, which has lower impacts (reduction in habitat function due to effects of a single contact with the gear) than bottom trawl gear.

Rationale: Similar to Alternative 2, the rationale for including this alternative for analysis is that it addresses impacts by the fishery with the highest score in the evaluation model (Appendix B), but in a more restrictive way. The effects of the GOA rockfish fishery on EFH would be further minimized under Alternative 3 because the entire upper and middle slope would be closed to this fishery rather than just designated portions of the slope.

2.3.3.4 Alternative 4: Bottom Trawl Closures in All Management Areas

Alternative 4 would amend the GOA and BSAI Groundfish FMPs to prohibit the use of bottom trawl gear in designated areas of the EBS, AI, and GOA. These areas would be year-round closures. In the EBS only, bottom trawl gear used in the remaining open areas would be required to have disks/bobbins on trawl sweeps and footropes. The management measures established by this alternative would be in addition to existing habitat protection measures (e.g., area closures, gear restrictions, and limitations on fishing effort). Area specific regulations are detailed below.

Bering Sea: This alternative would prohibit the use of bottom trawl gear for all groundfish fisheries in the EBS except within a designated "open" area. The open area is designated based on historic bottom trawl effort. Within the open area, there would be a rotating closure to bottom trawl gear in five areas to the west, north, and northwest of the Pribilof Islands. Closure areas would be designated in Blocks 1, 2, 3, 4, and 5, with 10-year closed periods for 25 percent of each block. After 10 years, the closed portion of each block would reopen, and a different 25 percent of each block would close for 10 years, and so on thereafter. After 40 years, all areas within each block would have been subject to a 10-year closure, and the rotating closure areas would start over. Open and closed areas designated under this alternative are shown in Figure 2-43.

In addition, bottom trawl gear used in the remaining open areas of the EBS would be required to have sweeps and footropes equipped with disks/bobbins to reduce contact area and proximity to the seafloor. The sweeps and footrope form a complete loop between the trawl doors. The footrope deploys immediately ahead of the bottom edge of the trawl net, and the sweeps connect each end of the footrope to a trawl door. The goal of the requirement would be to have configurations creating at least a 3-inch clearance below more than 90 percent of the length of any 35-foot section of sweep and at least a 3.5-inch clearance below more than 75 percent of the length of any 10-foot section of the footrope. In consultation with trawl captains, fisheries enforcement, and gear manufacturers, a measurement method would be developed to allow any 35-foot length of sweep and any 10-foot length of footrope to be evaluated to determine whether they meet these standards. A configuration that would meet sweep requirements would include discs or bobbins with a 9-inch minimum diameter separated by sections of disc spacers with a 3-inch maximum diameter, totaling at least nine times more lengths than the summed length of the large disks or bobbins. A configuration that would meet footrope requirements would include discs or bobbins with a 13-inch minimum diameter separated by sections of disc spacers with a 6-inch maximum diameter totaling at least three times more length than the summed length of the large disks or bobbins. The 9- and 13-inch-diameter disc sizes would have to be slightly smaller than what is commercially available (10 and 14 inches) to allow for wear and variations in production. The measurement technique would have to account for reductions in gear height due to bending or distortion of the large-diameter elements or large or off-center attachment holes. Metal weights attached to the sweeps or in-line chain cores in the sweeps would be restricted to within 18 inches of the large disks or bobbins. Two exceptions to the rules would be made: 1) the 100 feet closest to the doors would be unrestricted, and 2) the 50 feet of sweep closest to the end of the fishing line would be allowed to follow the footrope rule instead of the sweep rule. A diagram showing the configuration of trawl gear is provided in Figure 2-44.

Aleutian Islands: This alternative would prohibit the use of bottom trawl gear for all groundfish fisheries in designated areas of the AI. These areas would be permanent, year-round closures. Closure areas would be designated in the areas of Stalemate Bank, Bowers Ridge, Seguam Foraging Area, and Semisopochnoi Island. Closure areas designated under this alternative are shown in Figure 2-45.

Gulf of Alaska: This alternative would prohibit the use of bottom trawl gear for rockfish fisheries in designated sites of the GOA upper to intermediate slope (656 to 3,281 feet). These areas would be permanent, year-round closures. Vessels endorsed for trawl gear would be allowed to fish for rockfish with fixed or pelagic trawl gear in these areas. Closure areas designated under this alternative are shown in Figure 2-46.

Objectives

Alternative 4 has multiple objectives, which differ for each management region. In the EBS, one objective is to prevent bottom trawl fishing effort from expanding into unfished areas. This would prevent fishing gear from potentially disturbing previously unimpacted benthic habitat and EFH. As shown by gear research studies, the first pass of a bottom trawl over an area has more impacts on benthic habitat than subsequent trawls. Additionally, many of these unfished or lightly fished areas provide important nursery habitat for crab and flatfish species, as well as for major prey species such as herring and capelin. Another objective is to allow a portion of the habitat to recover to a status unaffected by bottom trawl fishing, through the use of rotating closures. This alternative would ensure that at least 20 percent of the habitat north and west of the Pribilof Islands would be fully recovered at any given time. These areas include EFH for a number of FMP species inhabiting the outer shelf and slope, including pollock, Pacific cod, several slope rockfish species, several flatfish species (e.g., flathead sole, Alaska plaice, Greenland turbot, etc.), sablefish, golden king crab, and deepwater Tanner crab species. Rotating closures in other areas were not considered because existing year-round trawl closures already protect a substantial amount of inner and middle shelf sand and silt habitats. Another objective of this alternative for the EBS is to reduce the amount of fishing gear contact with the bottom through the use of discs and bobbins to lift up the net and sweeps, thereby reducing the footprint of the gear. A secondary objective for the EBS is to limit the restrictions on fisheries to what might be practicable by allowing some areas to the northwest to remain open for the fleet to access to avoid halibut bycatch closures and, thus, still catch the TAC.

The objective of this alternative for the AI is to allow a portion of the shelf, slope, and basin benthic habitat to recover from the effects of bottom trawling. These habitats are EFH for a number of species covered by the BSAI Groundfish FMP and the King and Tanner Crab FMP, including pollock, Pacific cod, Atka mackerel, Pacific ocean perch, shortraker rockfish, rougheye rockfish, northern rockfish, thornyhead rockfish, other rockfish species, several flatfish species, Greenland turbot, sablefish, red king crab, golden king crab, scarlet king crab, and several species of Tanner crab. The objectives of Alternative 4 for the GOA are the same as those specified in Alternative 2.

Rationale

The rationale for including this alternative for analysis is that it addresses fisheries with the highest impacts (as determined from the preliminary evaluation) in the GOA (slope rockfish) and BSAI (flatfish trawl). In addition, trawl closure areas in the AI were included in this alternative to address concerns about the effects of trawling sponges, corals, and other living substrates.

2.3.3.5 Alternative 5A: Expanded Bottom Trawl Closures in All Management Areas

Alternative 5A would amend the GOA and BSAI Groundfish FMPs to prohibit the use of bottom trawl gear year-round in designated areas of the EBS, AI, and GOA. In the EBS only, bottom trawl gear used in the remaining open areas would be required to have disks/bobbins on trawl sweeps and footropes. The management measures established by this alternative would be in addition to existing habitat protection measures (e.g., area closures, gear restrictions, and limitations on fishing effort). Area specific regulations are detailed below.

Bering Sea: This alternative would prohibit the use of bottom trawl gear for all groundfish fisheries in the EBS except within a designated "open" area. The open area is designated based on historic bottom trawl effort, and no areas currently closed would be open. Within the open area, there would be a rotating closure to bottom trawl gear in five areas to the west, north, and northwest of the Pribilof Islands Closure areas would be designated in Blocks 1, 2, 3, 4, and 5, with 5-year closed periods for 33.3 percent of each block. After 5 years, the closed area would reopen, and the next 33.3 percent area of each block would close for 5 years and so on, thereafter. After 15 years, all areas within each block would have been subject to a 5-year closure, and the rotating closure areas would start over. Open and closed areas designated under this alternative are shown in Figure 2-47. Additionally, bottom trawl gear used in the remaining areas open to trawling in the EBS would be required to have disks/bobbins on trawl sweeps and footropes. These requirements are detailed in the section describing Alternative 4.

Aleutian Islands: This alternative would prohibit the use of bottom trawl gear for all groundfish fisheries in designated areas of the AI. Closure areas would be designated in the areas of Stalemate Bank, Bowers Ridge, Seguam Foraging Area, Yunaska Island, and Semisopochnoi Island. These closure areas extend to the northern and southern boundaries of the AI management unit. These areas would be permanent, year-round closures. Closure areas designated under this alternative are shown in Figure 2-48.

Gulf of Alaska: This alternative would prohibit the use of bottom trawl gear for all groundfish fisheries in designated sites of the GOA upper to intermediate slope (656 to 3,281 feet). Additionally, it would prohibit the use of bottom trawls for targeting GOA slope rockfish on the GOA upper to intermediate slope (656 to 3,281 feet), but would allow vessels endorsed for trawl gear to fish for rockfish in these areas with fixed or pelagic trawl gear. These areas would be permanent, year-round closures. Closure areas designated under this alternative are shown in Figure 2-49.

Objectives

Alternative 5A has multiple objectives, with different measures for each management region. In general, these are the same objectives as listed for Alternative 4, but with several modifications. For the EBS area, the objectives remain essentially the same, but the approach of Alternative 5A is slightly different in that larger areas are closed, but for shorter periods. Alternative 5A for the AI would allow a much larger portion of the benthic habitat to recover from the effects of bottom trawling and would include areas of the trench. The objectives of Alternative 5A for the GOA are similar to those specified for Alternative 4; however, Alternative 5A eliminates all bottom trawling from the closure areas, so an expanded objective is to allow the habitat within the closure areas to recover to a nearly unaffected fishing condition (noting that fixed gear fisheries would continue within the areas).

Rationale

The rationale for including this alternative for analysis is that it addresses additional fisheries with the higher evaluation scores in the GOA (slope rockfish, deepwater flatfish trawl) and BSAI (flatfish trawl), and in a more restrictive way. The effects of the all GOA slope trawl fisheries and the BSAI flatfish trawl fisheries on EFH would be further minimized under Alternative 5A. In the EBS, the closure areas are larger than in Alternative 4. In the GOA, the entire slope is closed to trawling for rockfish, and designated areas of the slope are closed to all groundfish trawling. In addition, trawl closure areas in the AI were included in this alternative to address concerns about the effects of trawling on sponges, corals, and other living substrates. To further minimize the effects of fishing activities in the AI, the areas included in this alternative are more extensive than the closure areas identified for Alternative 4.

2.3.3.6 Alternative 5B: Expanded Bottom Trawl Closures in All Management Areas with Sponge and Coral Area Closures in the Aleutian Islands

Alternative 5B would amend the GOA and BSAI Groundfish FMPs to prohibit the use of bottom trawl gear year-round in designated areas of the EBS and GOA, just like Alternative 5A. Existing closure areas would not be affected by this alternative; they would remain closed. In the AI, a system of open and closed areas would be established to reduce the effects of trawling on corals and sponges. Additionally, for the EBS only, bottom trawl gear used in the remaining areas open to trawling would be required to have disks/bobbins on trawl sweeps and footropes. The management measures established by this alternative would be in addition to existing habitat protection measures (e.g., area closures, gear restrictions, and limitations on fishing effort). Area-specific regulations are detailed below.

Bering Sea: This alternative would prohibit the use of bottom trawl gear for all groundfish fisheries in the EBS except within a designated open area. The open area would be designated based on historic bottom trawl effort, and no areas currently closed would be open. Within the open area, there would be a rotating closure to bottom trawl gear in five areas to the west, north, and northwest of the Pribilof Islands. Closure areas would be designated in Blocks 1, 2, 3, 4, and 5, with 5-year closed periods for 33.3 percent of each block. After 5 years, the closed area would reopen, and the next 33.3 percent area of each block would close for 5 years, and so on, thereafter. After 15 years, all areas within each block would have been subject to a 5-year closure, and the rotating closure areas would start over. Open and closed areas designated under this alternative are shown in Figure 2-47. Additionally, bottom trawl gear used in the remaining areas open to trawling in the EBS would be required to have disks/bobbins on trawl sweeps and footropes.

Aleutian Islands: Alternative 5B would include one of three options for the Aleutian Islands, as described below.

Option 1

1. Open areas would be designated where bottom trawling would be allowed in the AI. These areas would be based on areas of higher effort distribution from 1990 through 2001. Bottom trawling would be prohibited in all remaining sections of the AI management area. Pelagic trawls could be used outside of the designated open areas, but only in the off-bottom mode. Open and closed areas designated under this alternative are shown in Figure 2-50. The boundaries of open areas, as first designated by the data analysis, were converted to latitude/longitude coordinates (and most were adjusted into a rectangle shape) to facilitate enforcement.

2. TAC reductions would be made for individual stocks or species complexes, based on analysis of 1998 to 2002 data (see Appendix H for analysis methodology). This methodology would result in a 10 percent reduction in the BSAI Pacific cod TAC, a 6 percent reduction in the AI Atka mackerel TAC, and a 12 percent reduction in the rockfish TACs. No TAC reduction would be made for pollock, as this species would be harvested with pelagic trawl gear and, thus, would not be subject to closures.

3. Coral/bryozoan and sponge bycatch limits would be imposed to close specific fisheries and areas, if necessary. If a bycatch limit were reached (all species of corals and bryozoans, or all species of sponges) by a fishery within a regulatory area, the regulatory area would be closed to that fishery for the remainder of the fishing year. Closure areas would be based on AI regulatory areas 541, 542, and 543. Fisheries to be included in this program include

the trawl fisheries for Pacific cod, Atka mackerel, and rockfish. Bycatch limits would be based on levels of coral/bryozoans and sponges historically taken by these fisheries in these areas (see Appendix H for data analysis methodology). The limits are as follows.

Fishery	541	542	543
Atka mackerel			
sponge	10 mt	20 mt	66 mt
coral/bryozoans	2 mt	3 mt	8 mt
Pacific cod			
sponge	11 mt	22 mt	22 mt
coral/bryozoans	2 mt	1 mt	6 mt
Rockfish			
sponge	13 mt	5 mt	0 mt
coral/bryozoans	1 mt	1 mt	8 mt

4. Additional fishery monitoring measures would be implemented, including a requirement for 100 percent observer coverage and a vessel monitoring system on vessels fishing for groundfish in the AI. These measures would require that vessels use specially trained and experienced observers when possible.

5. A comprehensive plan for research and monitoring would be developed in the AI. The plan would include seafloor mapping, benthic research, and habitat impact assessment for all bottom tending gears, annual habitat assessment reports, and experimental fishing permits to identify additional open areas.

Option 2

1. Open areas would be designated where bottom trawling would be allowed in the AI. These areas would be based on the methodology used in Option 1 above, with eight specific modifications based on data analysis and input from fishermen and Aleutian Islands residents, as recommended by Oceana. The specific modifications involve the following areas: Buldir Island, Murray Canyon, South Amchitka, Petrel Bank, Gusty Bay, Kanaga Island, Adak South, and Atka Pass. Bottom trawling would be prohibited in all remaining sections of the AI management area. Pelagic trawls could be used outside of the designated open areas, but only in the off-bottom mode. Open and closed areas designated under this alternative are shown in Figure 2-51.

2. TAC reductions would be made for individual stocks or species complexes, based on analysis of 1998 to 2002 data (see Appendix H for analysis methodology). This methodology would result in a 6 percent reduction in the AI Atka mackerel TAC and a 12 percent reduction in the rockfish TACs. No TAC reduction would be made for Pacific cod or pollock.

3. Coral/bryozoan and sponge bycatch limits would be imposed to close specific fisheries and areas, if necessary, as specified in Option 1 above.

4. Additional fishery monitoring measures would be implemented, as specified in Option 1 above.

5. A comprehensive plan for research and monitoring would be developed in the AI, as specified in Option 1 above.

6. All bottom contact fishing would be prohibited in six coral garden sites located off Semisopochnoi Island, Bobrof Island, Cape Moffet, Great Sitkin Island, Ulak Island, and Adak Canyon, as shown in Figure 2-51.

Option 3

1. Open areas would be designated where bottom trawling would be allowed in the AI. These areas would be based on the methodology used in Option 1 above, with specific modifications based on data analysis and input from Aleutian Islands trawl fishermen, as recommended by the Groundfish Forum. Bottom trawling would be prohibited in all remaining sections of the AI management area. Pelagic trawls could be used outside of the designated open areas, but only in the off-bottom mode. Open and closed areas designated under this alternative are shown in Figure 2-52.

2. Additional fishery monitoring measures would be implemented, as specified in Option 1 above.

Gulf of Alaska: This alternative would prohibit the use of bottom trawl gear for all groundfish fisheries in designated sites of the GOA upper to intermediate slope (656 to 3,281 feet). Additionally, it would prohibit the use of bottom trawls for targeting GOA slope rockfish on the GOA upper to intermediate slope (656 to 3,281 feet), but would allow vessels endorsed for trawl gear to fish for rockfish in these areas with fixed or pelagic trawl gear. These areas would be permanent, year-round closures. Closure areas designated under this alternative are shown in Figure 2-49.

Objectives

The overall goal of Alternative 5B is to reduce the effects of fisheries on benthic epifauna, namely corals and sponges, via two specific objectives. The first objective is to prevent the expansion of bottom trawl effort into unfished areas through the use of designated open areas. The second objective is to allow habitat recovery in a relatively large portion of the AI by eliminating bottom trawling that had occurred with low effort outside of the designated open areas. Options 1 and 2 have two additional objectives: to control fishing effort (and hence habitat impacts) within the remaining open areas by setting TACs proportional to the amount traditionally taken from these areas and to reduce the bycatch of benthic epifauna by 1) establishing bottom trawl closure areas where coral, bryozoans, and sponges had previously been taken as bycatch and 2) establishing bycatch limits for these invertebrates. This alternative would also increase monitoring for enforcement.

Rationale

The rationale for including this alternative for analysis is the same as that identified for Alternative 5A, but would include more restrictions to minimize potential effects on corals and sponges due to trawling in the AI.

2.3.3.7 Alternative 6: Closures to All Bottom Tending Gear in 20 Percent of Fishable Waters

This alternative would amend the GOA and BSAI Groundfish FMPs, the Alaska Scallop FMP, the BSAI Crab FMP, and Northern Pacific Halibut Act of 1982 regulations to prohibit the use of all bottom tending gear (dredges, bottom trawls, pelagic trawls that contact the bottom, longlines, dinglebars, and pots) within approximately 20 percent of the waters shallower than 3,281 feet (i.e., the fishable waters). The closures established by this alternative would be in addition to existing habitat protection measures (e.g., area closures, gear restrictions, and limitations on fishing effort).

> *Gulf of Alaska*: The GOA would be subdivided into three regions: Western (corresponding to regulatory area 610), Central (areas 620 and 630), and Eastern (areas 640 and 650).
>
> *Aleutian Islands*: The AI would be subdivided into four regions: Western (corresponding to regulatory area 543), Central (area 542), Eastern (area 541), and two smaller EBS regulatory areas adjacent to the Aleutians (combination of areas 518 and 519).
>
> *Bering Sea*: The EBS would be subdivided into three regions south of St. Lawrence Island, based on predominant substrate types (sand, sand/mud, and mud) and the varying depth distribution of each substrate.

Closure areas designated under Alternative 6 are shown in Figures 2-53 to 2-55. The closed areas were identified based on the presence of habitat such as high-relief coral, sponges, and sea onions, with emphasis on areas with notable benthic structure and/or high concentrations of benthic invertebrates that provide shelter for managed species. The closed areas include a mix of relatively undisturbed habitats and habitats that currently are fished. Within a given region, existing area closures could comprise all or a portion of the closed areas for this alternative.

Objectives

The objective of Alternative 6 is to eliminate all effects of fishing on EFH in 20 percent of the area historically fished and to allow those areas to recover from the effects of fishing. For all practical purposes, the Alternative 6 closures can be considered marine reserves. With all commercial fishing except salmon and herring prohibited from these areas, fish removals would be virtually nil, because subsistence and sport fisheries are limited in the EEZ. The appropriate size of marine reserves depends on the management objectives, characteristics of the habitat, the mobility of the species requiring protection, and the management system outside of the reserve (NRC 2001). To date, no study has estimated marine reserve area requirements relative to the goal of protecting habitat or minimizing the effects of fishing on habitat. In the absence of these models, the 20 percent figure is used in this alternative.

Rationale

The rationale for including this alternative for analysis is that it addresses concerns about the effects of all fishing gear on EFH. This is the only alternative that includes the fisheries that ranked very low (i.e., low estimated impact on benthic habitat) in the preliminary fishery evaluation model (e.g., fisheries using jigs, pots, longlines, and pelagic trawls).

2.4 Preliminary Preferred Alternatives

At its October 2003 meeting, the Council selected preliminary preferred alternatives for each of the three actions in the EIS. The preliminary preferred alternatives are those alternatives currently favored by the Council based on the information available. Such selection allows members of the public to tailor their comments on the draft EIS accordingly. Based on public comments and any new information that becomes

available, in the final EIS, the Council and NMFS may reaffirm these alternatives as the preferred alternatives, or may select different preferred alternatives.

NOTE TO READERS: The final EIS will be revised to reflect the final preferred alternatives selected by the Council at the February 2005 meeting.

2.4.1 Preliminary Preferred Alternative for EFH Description

The Council selected Alternative 3, the Revised General Distribution, as its preliminary preferred alternative for describing and identifying EFH. Under that alternative, EFH descriptions would incorporate updated scientific information, and the resulting EFH areas would represent 95 percent of an accumulated population index for each managed species, as described by a GIS analysis. The approach would result in smaller EFH designations for adults and juveniles of many species as compared to the status quo. The Council chose not to endorse Alternative 4 (Presumed Known Concentration), which NMFS had recommended (see Appendix E), because of concern that the narrower EFH designations resulting from Alternative 4 might not account for changes in habitat usage over time.

2.4.2 Preliminary Preferred Alternative for HAPC Identification

The Council selected Alternative 3, the Site Based Approach, as its preliminary preferred alternative for adopting an approach to identify HAPCs. Alternative 3 would rescind the existing HAPCs, which are very broad types of habitat, and adopt a more focused site-based approach that should provide a better tool for management purposes. The Council chose not to endorse Alternative 4 (Type/Site Based Approach), which NMFS had recommended (see Appendix E), because of concern that picking specific habitat types within which HAPCs could be identified might limit the Council's flexibility in the future. However, as discussed below, the Council identified two priority habitat types for its first call for HAPC proposals. This enabled the Council to achieve the benefits of Alternative 4 without locking itself into a strict stepwise process of always identifying priority habitat types before considering site-specific HAPCs.

The Council's process for considering new HAPCs and associated management measures is described in Appendix J. In summary, the Council may accept proposals from the public every 3 years for specific HAPCs. HAPC proposals would have to meet at least two of the four considerations specified in the EFH regulations at 50 CFR 600.815(a)(8), and rarity of the habitat would be a mandatory criterion. Proposals would be screened by Council staff, reviewed by the appropriate plan teams (including socioeconomics, management concerns, and enforceability), and then considered by the Council to determine which proposals warrant full analysis and stakeholder review. The Council specified two types of habitat as the priority for the first call for proposals: named seamounts in the EEZ and largely undisturbed, high-relief, long-lived hard coral beds, with particular emphasis on those located in the AI. The first call for proposals was announced on the Council's and NMFS' web sites and in a Federal Register Notice (68 FR 65676; November 21, 2003), with proposals due by January 10, 2004. As discussed in Section 1.1 of this EIS, the identification of specific HAPCs will be analyzed in a separate environmental analysis.

2.4.3 Preliminary Preferred Alternative for Minimizing the Effects of Fishing on EFH

The Council selected Alternative 1, Status Quo Measures, as its preliminary preferred alternative for minimizing the effects of fishing on EFH. The Council's decision was based on its review of the results of a preliminary draft of this EIS, including the analyses in Chapter 4 and Appendix B. Alternative 1 incorporates many existing measures that protect habitat, such as the Bristol Bay closure area, Pribilof Islands habitat conservation area, Southeast Alaska trawl closure, Sitka Pinnacle marine reserve, red king crab savings area, Kodiak king crab protection zones, and Steller sea lion measures. The Council also

initiated a HAPC process to consider additional habitat protection (see Appendix J). NMFS had not recommended any particular management alternative for this action, but had encouraged the Council to consider additional precautionary management measures to avoid disturbance to fragile sea floor habitats that are especially slow to recover (see Appendix E). The Council's preliminary preferred alternative is consistent with that recommendation.

2.5 Alternatives Considered and Eliminated from Detailed Study

During the development of the alternatives for this analysis, several proposals and other ideas for alternatives were considered, but eliminated from further study. A summary of these alternatives, and a brief rationale as to why they were not fully analyzed in the analysis, is provided below.

2.5.1 EFH Description Alternatives Eliminated

Core area approach: This alternative, originally developed by the EFH Committee, was termed the core area approach. Under this alternative, description of EFH would be limited to those core areas known to be crucial to the production of species or species groups. Under this alternative, one would have to know the link between habitat and fish productivity (i.e., Level 4 information). Because the data to connect fish productivity with habitat are unavailable, the Committee discussed staff's recommendation of using the survey CPUE data (highest 10 percent) to define a core area for a species and thought that this designation would end up with a result that would differ from the initial concept. Survey locations (both longline and trawl) are excluded from areas that are too rough to fish because of boulders, snags, or other potential gear problems. In essence, the results of a high-survey CPUE for a species such as rockfish would not necessarily account for its true core area because rocky habitats are not sampled. Furthermore, the survey is conducted seasonally, which can create a problem with the perceived distribution of a species year-round. In the end, the Committee recommended (and the Council concurred) that this alternative be eliminated from further consideration because it would not reduce the range or contrast between alternatives. Furthermore, the concept on which this alternative was based is contained in other alternatives, should data become available.

EFH limited to unique habitat types: This alternative, considered by the EFH Committee in November 2001, would have described EFH as a range of unique habitat types of special concern. The Magnuson-Stevens Act defines EFH as those waters and substrate necessary to fish for spawning, breeding, feeding, or growth to maturity. Under this alternative, EFH would be described as those areas that were especially vulnerable and required additional protection. It is unlikely, however, that all fish species rely on one unique habitat type for these life functions. Because this alternative did not appear to meet either the Magnuson-Stevens Act definition for EFH or the guidelines set forth in the rule for identification and description of EFH, it was dropped from further consideration.

EFH described based on stock size: This alternative, discussed by the EFH Committee, would have classified and described EFH based on stock abundance. Thresholds for stock abundances (such as minimum stock size thresholds) would be used to adapt EFH classification levels, providing for reversion to lower classification levels in response to reduced stock abundance. In other words, if a stock was healthy, EFH would be based on the highest level of information as described in the final rule. If the stock was below some level, EFH for that stock would be identified and designated at the next lowest level, thus broadening the area of EFH for that stock. This distinct alternative as specified was dropped from further consideration because the concept of adding additional areas of EFH to stocks when they are in an overfished condition was included in Alternative 4.

2.5.2 HAPC Identification Alternatives Eliminated

Ecosystem approach: This alternative would have allowed for HAPC designations to be made using an ecosystem approach. Under this approach, HAPC would be defined as the area required by multi-species associations or assemblages to maintain diversity and sustainability. The concept behind this alternative would have been to designate any areas known to be ecologically important from a system-level perspective. The EFH Committee discussed this alternative and realized that the amount of information required for this alternative was prohibitive. To designate HAPC using this approach, NMFS would have to understand the role of each species in its particular habitats and the linkages in the ecosystem. This alternative was dropped from further consideration because HAPC designations could not be made using this approach, given limitations of current scientific information.

Classification approach: This alternative would have identified HAPC using a classification approach, based on the criteria established in the Final Rule (rarity, sensitivity, vulnerability, and ecological importance). HAPC would be classified with one of the following levels of concern: A equals very rare habitats; B equals rare and sensitive habitats; C equals rare, sensitive, and vulnerable; and D equals rare, sensitive, vulnerable, and ecologically important. The EFH committee had noted that under this classification system, only rare habitats could be identified as HAPC; however, the HAPC criteria in the final rule did not make this distinction, and the EFH Committee was concerned that significant habitats that would not be considered rare (e.g., eelgrass beds, kelp beds) would never be identified as HAPC. Thus, this alternative was dropped from further consideration.

Sites implemented immediately: This alternative would have established HAPC sites (and or types) that would be implemented immediately as a result of final decision on this analysis. At several EFH Committee and Council meetings, members of the public proposed a number of HAPC sites that they wanted evaluated as part of the analysis. Because the guidance and criteria for HAPC identification provided in the rule are not very specific, an individual could argue that almost any place in the ocean (or freshwaters for anadromous fish) deserved to be identified as an HAPC. It was clear that additional thought and evaluation had to go into developing criteria for designating HAPCs, and a process for including public proposals for HAPC designation had to be developed before specific sites could be designated. Additionally, EFH had to be identified before HAPCs could be designated because HAPC is a specific type or area of habitat within EFH; hence, the alternatives in this analysis focus on different ways to designate HAPCs, rather than designation of specific HAPC sites. HAPC designation is not required by law or regulation. Inclusion of an alternative to designate specific HAPC sites, prior to development of additional criteria and designation of EFH, would have resulted in a number of ad hoc HAPC designations; therefore, this alternative was dropped from further consideration.

2.5.3 EFH Fishing Impact Minimization Alternatives Eliminated

Trawl closures in areas with sessile epifauna: This alternative would have designated closures to all bottom tending gear in areas with high concentrations of corals, sponges, and sea onions. The Council originally included this alternative in the list of preliminary preferred alternatives issued in October 2002. After review of the data sources that could potentially be used to determine where the areas of high concentration might occur and a discussion about the scale of these closures, the EFH Committee recommended that protection of living substrates be included in a future HAPC process. This would enable using better scientific information as it becomes available. Survey data for benthic emergent epifauna were considered usable for the EBS shelf, but not useful for understanding density in the AI or GOA slope areas. Essentially, the trawl surveys tend to avoid rough bottom where the survey gear could be damaged—the same bottom types where corals might occur (Stauffer, G., October 2002, AFSC personal communication to EFH workgroup). This concept of closing areas having high density of corals and sponges was included in

Alternative 5B for the AI by using fishery bycatch rate data. The concept was also included in Alternative 6, whereby areas closed to all bottom tending gear would be established based to some extent on available data regarding the presence of corals, sponges, and sea onions. For these reasons, this mitigation alternative was considered, but not fully analyzed.

Prohibition of all bottom tending gear: This alternative would have prohibited the use of all bottom tending gear (all trawl, dredge, longline, and pot gear) from all marine waters off Alaska. This idea is similar to a previously examined policy for groundfish fisheries, termed the no-fishing policy, whereby the total allowable catch would be set at zero, essentially ending all commercial groundfish fishing in the EEZ off Alaska. This alternative has been considered previously (NMFS 1998a, NMFS 2001a), but was not adopted because it would be inconsistent with the legal requirements of the Magnuson-Stevens Act. While this alternative may have positive benefits to habitat by eliminating all crab, scallop, and groundfish fisheries (except jig gear), it would have major adverse biological, social, and economic consequences (NMFS 2001a). The primary goal of NMFS and the Council is to provide sound conservation of living marine resources, while also providing socially and economically sustainable fisheries. Because this alternative would run counter to this goal, it was not considered to be a reasonable alternative and, therefore, was dropped from further consideration.

No-take marine reserves: This alternative would have established a series of no-take marine reserves around the coast (encompassing up to 20 percent of the area). This alternative was included in the original list of alternatives recommended by the EFH Committee and presented to the Council at its meeting in September 2002. Following public testimony and after receiving advice from the Scientific and Statistical Committee and Advisory Panel, the Council dropped it from further consideration. The rationale for not including this alternative is that protection of EFH offered by no-take marine reserves would be no greater than that provided for in Alternative 6, which closes 20 percent of the fishable waters to all bottom tending gear. The difference between the two alternatives is that Alternative 6 would allow fishing in the areas using jig gear, surface gill net gear, seine gear, and rod and reel gear (gear types that have virtually no measurable impact on benthic habitat and very low catches of prey species). Thus, to include this alternative as a way to minimize the effects of fishing on EFH would result in no added benefit to the conservation of EFH, but would likely result in significant costs to commercial fishermen who target salmon and herring and recreational fishermen who fish for salmon, halibut, and other species.

It is widely acknowledged in the popular and scientific literature that properly designed no-take marine reserves can be a useful management tool for maintaining sustainable marine ecosystems (by maintaining biodiversity, providing control sites for scientific research, providing seed banks for larval recruitment, providing increased populations and yield, conserving the gene pool, protecting sensitive benthic habitats, and providing a buffer against uncertainty and errors in management of marine fisheries [Agardy 2000, NRC 1999a, NRC 2001]). Nearly all the benefits described for no-take marine reserves, including conservation of EFH, would also accrue from closures to bottom tending gear that are considered under Alternative 6, and, to a lesser extent, the trawl closures considered in all other alternatives in this analysis. It was noted that the Council will be considering and evaluating no-take marine reserves as part of the revised draft programmatic groundfish SEIS (NMFS 2003a), which is broader in scope than this analysis (which is focused on conserving and protecting EFH).

Given all of these reasons, the Council concluded that a system of no-take marine reserves would not be a reasonable (or practicable) alternative for minimizing the effects of fishing on EFH.

TAC reduction to reduce effort: This alternative would have reduced TAC for species historically harvested within closure areas. This alternative was considered as a stand-alone alternative and as a part of alternatives that established closure areas to all or specific gear types. The concept behind this alternative

was that a TAC reduction would result in less effort and thus less time for gear to contact the bottom. When included as a provision to go along with closure areas, a TAC reduction would tend to reduce the effects of any redistribution of effort in remaining open areas. The Council, its Advisory Panel, and the EFH Committee evaluated this alternative and decided to drop it for several reasons. A TAC reduction would impose high costs on the fishing fleets, communities, and the nation and might not provide for optimum yield as required under the Magnuson-Stevens Act. Thus, the alternative was considered unreasonable and not a practicable way to reduce the effects of fishing on EFH. Fishing effort is relatively low, the current harvest rates are very conservative for most species, and most fish species tend to move large distances (thus becoming available for capture outside closure areas). Existing trawl closure areas, as well as additional closure areas under consideration in this analysis, were designed to protect the sensitive habitats. Any effect on EFH from increased efforts outside of the closure area would be more than offset by the reduction of effort inside closure areas, thus, negating the usefulness of any TAC reduction. Nevertheless, the concept of a TAC reduction was included in Alternative 5B for analysis, but it was not considered a reasonable alternative for application in all areas.

Rationalization of all fisheries to reduce effort: This alternative would have established a rationalization program for GOA and EBS groundfish fisheries not already rationalized by the IFQ, CDQ, or AFA programs. This issue was discussed by the EFH Committee early in the process, as participants from the fishing industry were interested in rationalization programs. There are two primary reasons for not including this as an alternative in this analysis. First, rationalization programs take a long time to develop and analyze. In this case, it would be impossible to analyze a rationalization program and still meet court-ordered deadlines. Second, and perhaps most important, rationalization programs would not be considered a reasonable alternative to meet the purpose and need identified for this action. There are many reasons for rationalizing fisheries, but habitat protection is only a potential ancillary benefit of such rationalization. Rationalization programs can, in some cases, allow the fishing fleet to reduce effort and modify their behavior so that there are fewer impacts to habitat. Nevertheless, rationalization programs, which are designed primarily to increase efficiency in the fisheries, are well beyond the scope of this analysis. Rationalization programs currently are being evaluated in other analyses for BSAI crab fisheries and GOA groundfish fisheries.

Prohibition of bottom trawling: This alternative would prohibit the use of bottom trawl gear in the EEZ and would convert fisheries to fixed gear (pot and longline) only. This alternative was suggested in public scoping and discussed by the EFH Committee. It was not recommended as an alternative for analysis for several reasons. First, as shown by the preliminary evaluation model and the final fishery evaluation (Appendix B), bottom trawl fisheries have different levels of effects on benthic habitat, depending upon the species targeted and where fishing occurs. Therefore, not all bottom trawl fisheries would be considered to affect habitat in a way that is more than minimal or not temporary, the standard required by the EFH final rule. Second, some fish species (e.g., small mouth flatfish species, Atka mackerel) cannot be captured effectively with gear other than bottom trawls. Thus, the TACs would not be taken, and OY would not be attained, affecting the practicability of this alternative. Although this alternative may have positive benefits to habitat by eliminating all trawl fisheries, this alternative would have major adverse social and economic consequences. A goal of NMFS and the Council is to provide sound conservation of living marine resources, while also providing socially and economically sustainable fisheries. Because this alternative would run counter to this goal, it was not considered to be a reasonable or practicable alternative to minimize the adverse effects of fishing and was dropped from further consideration.

Draft Programmatic Groundfish SEIS fixed gear reallocation and open areas: This alternative would have included the measures contained in the draft programmatic groundfish SEIS Alternative 5, which was a policy regime designed to protect and restore EFH (NMFS 2001a). The primary component measures of the Draft Programmatic Groundfish SEIS Alternative 5 were designation of open areas and TAC reallocation of

rockfish and Pacific cod to fixed gear. Analysis of the alternative showed that reallocation of TAC from trawl to fixed gear may not provide all of the benefits envisioned. The analysis showed that the bycatch rate of some emergent epifauna (e.g., coral, anemones, sea whips, sponges) in fixed gear was similar to trawl gear for some fisheries, so a reallocation of TAC would not result in large reductions of habitat impacts. For the current EFH analysis, the idea of TAC reallocation was included in a modified sense of being a voluntary reallocation for GOA rockfish in Alternatives 2, 3, 4, 5A, and 5B through voluntary reallocation of GOA rockfish. The open area approach was included in this analysis as part of Alternatives 4, 5A, and 5B. Given the concerns regarding the draft programmatic groundfish SEIS alternative as a stand-alone alternative for this analysis and the inclusion of the concepts into other alternatives, the SEIS alternative was dropped from further analysis.

Research closures only: This alternative would have established small closures designed for researching the effects of fishing on habitat. This alternative was not included as a stand-alone alternative because it did not appear, by itself, to minimize the effects of fishing on EFH. Research closure will likely be considered and adopted as part of any alternative chosen as the preferred alternative. Nevertheless, because research closures alone would not minimize the effects of fishing on EFH, they were not further analyzed as a stand-alone alternative.

Prohibition on retention of sessile epifauna: This alternative would have prohibited the harvest and retention of benthic emergent epifauna (such as mussels, kelp, corals, sponges, etc.). The objective of this prohibition was to reduce habitat loss by returning some biota back into the sea. The Council had previously adopted Amendments 65/65 to the Groundfish FMPs to prohibit the retention of corals and sponges in groundfish fisheries. NMFS did not approve the amendments. They instead responded that the state of Alaska was in a better position to regulate the harvest of these animals and plants. Because virtually all benthic epifauna are currently returned to the sea soon after being incidentally caught (with the exception of a few coral colony specimens that are retained as curios by fishermen), there are no additional benefits provided by this alternative. Because this alternative was not significantly different from status quo, it was dropped from further consideration.

Maximum size for trawl roller gear: This alternative would regulate the maximum size of rollers and rockhoppers used on trawl footropes. It was suggested in public scoping (specifically suggesting maximum diameters of 4 to 8 inches) and discussed by the EFH Committee. Similar gear modifications are seriously being considered as an alternative to minimize fishing effects on EFH in the New England region (NEFMC 2002). The rationale is that smaller-diameter rollers may prevent fishermen from trawling on rough or rocky bottoms. Off New England, there are incentives for fishermen to risk ripping up their nets by fishing on rough bottom to catch cod; fish prices are relatively high, total allowable catch levels are not established, fishing effort is high, allowable days at sea are limited, and stock biomass and catch rates are relatively low. This is not the case off Alaska where fishermen generally try to avoid rough bottoms. Such a regulation in Alaska could potentially result in more impacts to habitat, rather than less, because smaller-diameter rollers result in more contact with the seafloor, which would presumably translate into more effects on habitat. Alternatives 4, 5A, and 5B considered in this EIS, in fact, require minimum diameters for rollers on footropes with the objective of reducing contact of the gear on the bottom.

Application of 5B methodology to GOA and EBS: This alternative would have used the components and the methodology developed for the Alternative 5B open area approach for the AI and applied that to the GOA and EBS areas. NMFS staff applied this methodology and presented results (maps and tables) to the Council in April 2003. The results indicated that this approach did not appear to provide much in the way of habitat conservation benefits, but would be expected to have substantial economic impacts to fisheries and fishing communities. For example, in the EBS, restricting the fleet to small designated open areas would preclude bottom trawling from areas with much lower bycatch rates for corals, bryozoans, and

sponges; thus, implementation of this alternative would actually increase the bycatch of these sessile epifauna. In the GOA, there appeared to be very little benefit (in terms of habitat conservation) for the costs associated with forcing the fleet into numerous, small, and scattered open areas; a bycatch reduction of only 11 to 14 percent for corals/bryozoans and sponges was estimated. Application of this alternative for GOA fisheries was projected to have high economic costs to smaller vessels in the trawl fleet due to the requirement for 100 percent observer coverage. This alternative was also considered not practicable from the standpoint that the open areas only reflect a recent snapshot of where fish have been found in fishable concentrations in the recent ecosystem regime and do not reflect fish movement and changes in fish distribution that are likely to occur in the future. Also, Steller sea lion closures were not included in the analysis, so economic impacts could be much higher due to even smaller open areas for fishing. The Council deliberated the possible inclusion of this alternative at its April 2003 meeting and noted that the methodology made sense to include as a reasonable alternative to minimize the effects of fishing in the AI—where the fleet operates in predictable and discrete areas, and there appear to be substantial patches of corals, sponges, and bryozoans—but not for the EBS or GOA, for the reasons described above. Instead, the Council recommended that one part of the methodology (identification of areas with concentrations of sessile epifauna) be considered as part of a subsequent process to identify and designate specific HAPC areas.

Application of 5B methodology based on cumulative total catch: At its June 2004 meeting, the Council directed staff to develop a new option for the Aleutian Islands component of Alternative 5B for minimizing the effects of fishing on EFH. The new option would identify open areas based on the areas with recorded catches of 200 mt or more as reflected in NMFS observer data from 1991 to -2003. The new option would exclude TAC reductions and coral bycatch caps. Initial analysis of this option revealed that identifying open areas based only on observer records of catch resulted in the exclusion of some areas the fishing industry considers important and the inclusion of certain areas that may not be fished actively. As a result, the Council did not carry this option any further and instead decided to include a different option for Alternative 5B in the final EIS. That option reflects input from Aleutian Islands trawlers regarding the areas that historically have supported the highest groundfish catches.